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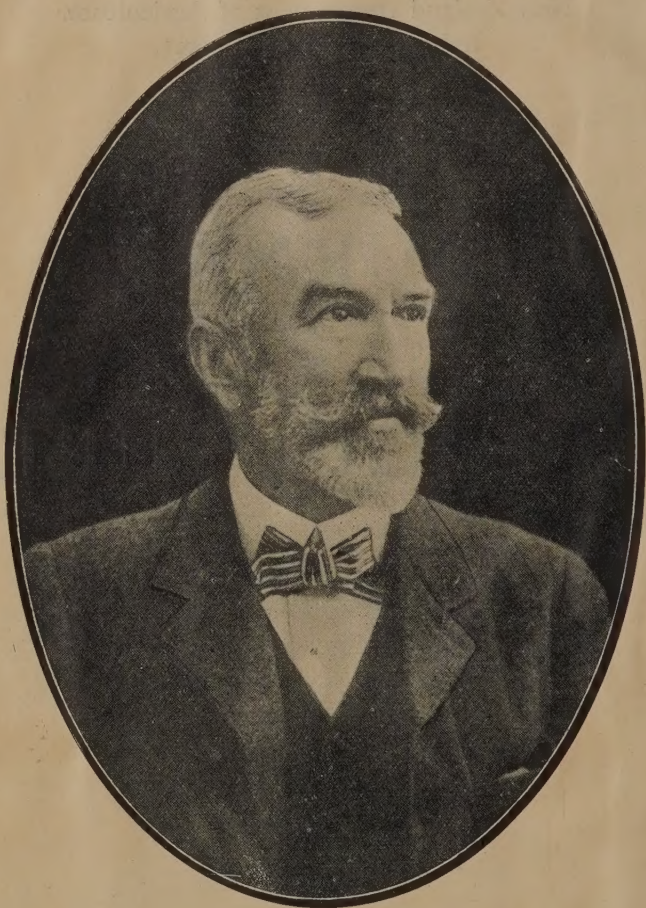
C. E. CUMING, Editor.

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**Journal of Agriculture.**

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**THE FLAX - GRUB.**

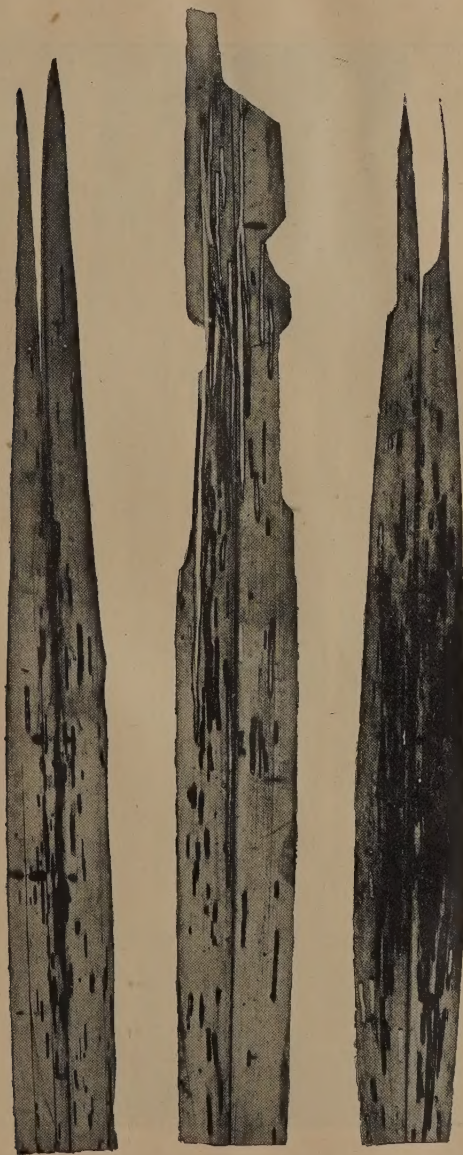
A. H. COCKAYNE.

**T**HE production of Phormium fibre is one of the most important of what may be termed the secondary rural industries of New Zealand. During the past ten years the average amount of fibre annually milled from the Phormium areas has exceeded 24,000 tons. The majority of the fibre is shipped overseas, and the average annual value of that exported during the past decade has been £556,000. To this amount has to be added the value of that converted locally into cordage and binder-twine. This internal trade consumes each year some 2,500 tons, the value of which is approximately £55,000. Again, in considering the amount that is derived from our Phormium areas the value of the tow produced in the extraction of the fibre from the leaf has to be taken into account. Thus the annual value of our fibre crop exceeds £600,000 per annum. This amount is not large compared with that derived

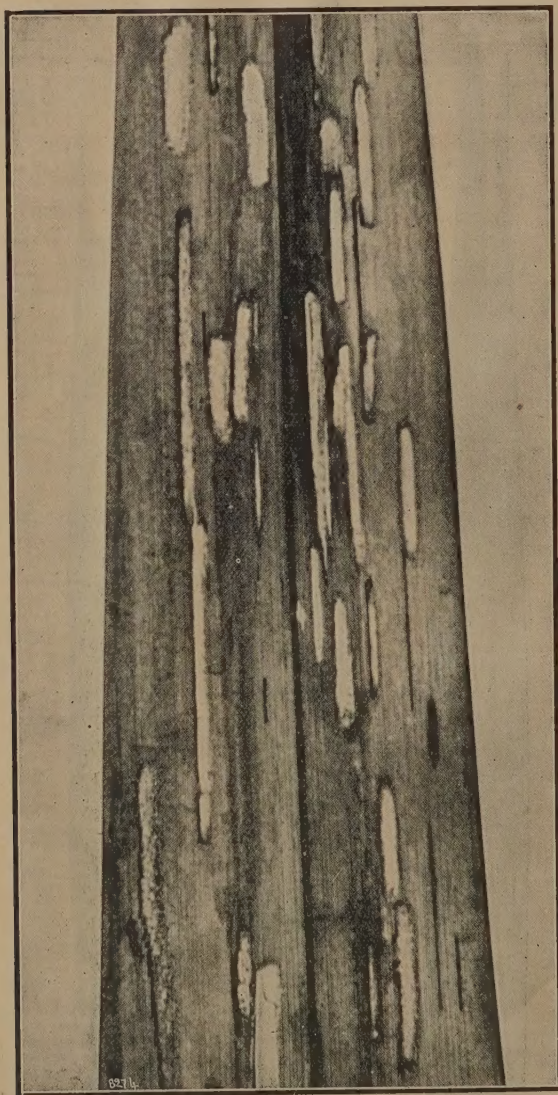
from the three great primary industries of wool-growing, meat-production, and dairying. It, however, represents a far greater gross return on the capital invested on its production than can be claimed by any other agricultural enterprise except those of a specially intensive character, such as market-gardening and orcharding. It is estimated that the total value of the land employed for the growing of Phormium and the machinery necessary for the extraction of the fibre does not exceed one and three-quarter million pounds. The area devoted to the growing of Phormium comprises only some 65,000 acres, so that a gross return of nearly £10 worth of fibre is produced annually from each acre.

Originally, apart from fires during seasons of drought and the undrained condition of the swamps—this causing a slow and stunted development of leaf, together with increasing the difficulties of harvesting the leaf—the production of Phormium was not attended with any serious risks. Areas that were naturally well drained contained a large admixture of useless plants, such as toetoe, and their removal was a necessary and somewhat expensive undertaking. The draining of the flax swamps has increased the rapidity of growth of the leaves, and has rendered them capable of being triennially harvested, a work which has been also greatly facilitated. It enabled, too, large areas formerly occupied by raupo and other vegetation and covered with standing or slow-moving water to become almost pure associations of Phormium through the natural seeding. This was aided in many cases by the removal of any other tall extraneous growth, such as toetoe, manuka, and tall fescue, that might otherwise have become dominant on the ground left unoccupied through the death of the raupo caused by the removal of the surface water. In modifying the soil-conditions and rendering these favourable for the development of pure stands of vigorously growing Phormium the draining of the flax areas has been of immense value in the development of the fibre industry. On the other hand, this work has led to the creation of certain conditions that are admirably suited to the development of factors that are extremely prejudicial to successful fibre-production. The two factors that stand out most prominently in this respect are those of fire and insect-injury.

The comparatively dry condition of all drained flax areas has greatly increased the danger of the periodic destruction of the leaves through fire. The surface of the ground is covered with the old dry leaves and with other material that in dry summers becomes exceedingly inflammable. When once a fire has started it spreads with great rapidity and completely destroys large areas unless the individual blocks of flax are well separated from one



INJURY OF THE LEAF-SURFACE CAUSED BY XANTHORHOE.



PORTION OF LEAF SHOWING THE INJURY CAUSED  
BY XANTHORHOE.

*E. B. Levy, photo.*

another by wide fire-breaks. Unfortunately, little attention has been given to the preparation and maintenance of fire-breaks, with the result that extensive damage is almost sure to occur during every dry summer.

In the early days of the Phormium industry there were few complaints concerning the destruction of leaves through fungus and insect attack. To-day, however, the term "diseased leaf" is a familiar one to all millers, and in certain seasons the loss of leaf due to both fungi and insects is so great as to either render the harvesting of the crop quite an unpayable proposition or to seriously reduce the marketable quality of the fibre.

Undoubtedly the most serious injury to flax swamps at the present day is caused by the larvæ of a native moth called by millers the "flax-grub." The injury done by this larva is quite characteristic. It consists of the gouging-out of narrow strips of tissue on the outer side or back of the leaves. These strips of eaten-out tissue do not extend right through the leaf, the epidermis and a portion of the tissue of the inner or outer surface of the leaf being left intact. The fibres are, however, completely destroyed throughout the length of the gouged-out portions. In consequence of this the continuity of the fibre is broken, and it becomes comparatively useless. The most noticeable feature is that the upper side of the

leaf is never attacked, the insect always selecting the back for the scene of its operations. In cases of severe attack the leaves are practically destroyed, and even when only comparatively badly injured the loss in milling is often severe, great difficulty being experienced in securing even a grade of "fair" quality. During certain seasons in many swamps a loss of quite 20 per cent. of the leaf is experienced, so that the great damage done by this insect can be well understood.

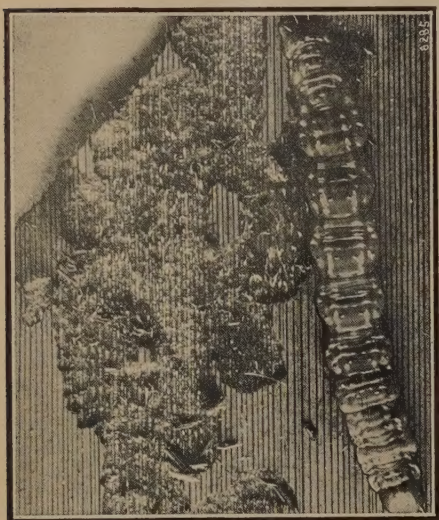
Until quite recently it was thought by many people that the damage was done by the native slug *Athorocophorus* (*Janella*)



LARVÆ OF *XANTHORHOE PRAEPECTATA*—NATURAL SIZE.

*E. B. Levy, photo.*

*bitentaculatus*, an animal that is abundant in all flax swamps. In the 1909 annual report of this Department Mr. T. W. Kirk and myself, in an article on the diseases of flax, definitely stated that the injury was caused by this slug. Their presence in large numbers on affected leaves led to this supposition, but I always inclined to the opinion that it did not do any injury, but fed entirely on decaying matter at the bases of the plants. During the past summer, thanks to the courtesy of Mr. Alfred Seifert, managing director of the A. and L. Seifert Flax-dressing Company, I have been enabled to



LARVA OF XANTHORHOE PRAEPECTATA—TWO  
AND A HALF TIMES NATURAL SIZE.

E. B. Levy, photo.

thoroughly investigate the cause of the injury, and experiments conducted in the laboratory have shown that the Janella slug is quite harmless. In the early part of October freshly injured flax was examined in the Makerua district, and considerable numbers of larvæ were found on the leaves. These were bred out, and the moth known as *Xanthorhoe praepectata* emerged in the middle of November. Until the time of their pupation the larvæ were fed with flax-leaves, and they produced on them the typical injuries that had previously been attributed to Janella attack.

At the same time a large number of adult Janellas as well as eggs were collected, and their behaviour under captivity was carefully studied. The adult specimens were kept well supplied with fresh flax-leaves, but in no case were the leaves in the least degree injured. The eggs soon hatched, and the young slugs were supplied with quite rotten flax-leaves on which they thrive well, indicating that they normally feed on the decaying herbage that is found in large quantities at the bases of the flax-plants.

*Xanthorhoe praepectata*, now shown to be the cause of the main damage to Phormium, was until quite recently regarded as a comparatively rare insect. It has apparently increased enormously of recent

years in flax swamps, due no doubt to draining and the setting-up of conditions favourable to the increase of this pest. It has been noted that diseased leaf is comparatively absent in swamps that become periodically flooded, and it is only reasonable to expect that this should be the case. Again, it is highly probable that the almost total destruction of the insect-eating water-fowl and swamp-birds, formerly so abundant in the flax areas, <sup>has helped</sup> ~~kept down~~ the spread of *Xanthorhoe* to a large extent.

It is not yet known how many broods of the pest occur each season, nor whether these are quite distinct or overlap one another, as is the case with many of our native moths, and even with those introduced. From my observations, however, there seem to



E. B. Levy, photo.

FEMALE.

MALE.

MOTHS OF *XANTHORHOE PRAEPECTATA*—NATURAL SIZE.

be two periods in the year when fresh injury is apparent—namely, in the months of September, October, and November, and of March and April. This certainly points to the fact that this species of *Xanthorhoe* is double-brooded, so far as the southern end of the North Island is concerned. The full life-history of this moth is being carefully studied, as until a full knowledge of its habits is acquired it is quite impossible to suggest any remedial measures that are likely to be successful in practice.

In the introduction to these notes it was shown that the gross return from flax areas was high. If the loss due to *Xanthorhoe* can be put down as low as 10 per cent. it is obvious that control measures for its suppression that would be far too costly in the case of crops of small value might be employed with profit.

*Native Grasses.*—A number of varieties have been added to the collection of native grasses at the Ruakura Farm of Instruction. These were obtained from D. Petrie, Esq., Epsom, Auckland. Most of them are very rare species, and their inclusion in the Ruakura collection adds considerably to its value. They include *Microlaena polynoda*, *Stipa arundinacea*, *Festuca* sp. from Lake Pukaki, *Poa australis* var. *leioclada*, *Poa Kirkii*, *Poa imbecilla* var., *Poa Colensoi*, *Danthonia Buchanani*, *Deyeuxia pilosa*, *Deyeuxia Youngii*.

## WESTERN WOLTHS AND PRAIRIE GRASS.

PRIMROSE McCONNELL.

UNDER certain conditions, there can be no doubt as to the value of Western Wolths and prairie-grass as additions to our present list of grasses, but, generally speaking, they are not suitable for mixing with the ordinary grass and clover seeds which are sown for permanent-pasture making. As a matter of fact, very few of what may be termed late introductions can be sown with advantage in pasture-mixtures on good or medium soils, although they may find a place on soils of a very poor nature, and under extreme climatic conditions. Perhaps better results would be had if more time were spent in improving well-tried grasses and clovers and less in the introduction of new ones.

Western Wolths is essentially a forage grass, and perhaps no other will give better results in a given time. Like all rye-grasses, it is a gross feeder, but if the seed is not allowed to ripen it will yield results which more than compensate for any extra soil-exhaustion, and if mixed with a few pounds of crimson-clover seed the soil-exhaustion will be reduced to a minimum and the forage correspondingly improved. It is excellent when sown immediately after harvest as a catch-crop, and if fed off in breaks before the grass gets too long it will be found ideal fodder for all classes of stock, and lambs will fatten rapidly on it. For dairy cows it is also good, and if soiled will yield two or more cuttings between the end of harvest and early spring. It is not a drought-resister, and for this reason late spring sowing is not advisable in the average season; 25 lb. of Western Wolths and 5 lb. of crimson clover is a good seeding. If sown at all with a permanent-pasture mixture the quantity should be not more than 2 lb. or 3 lb. per acre, as it is a vigorous grower and will smother all other grasses if a greater amount is used. At Ruakura, the first cut of this grass has yielded up to 15 tons per acre. A small area may be allowed to ripen seed for future use, and although some authorities are of opinion the New-Zealand-grown seed does not yield good results, the conclusion is not confirmed by the experience at this farm. It is a grass which should not be sown on poor soil, but when sown under good conditions and liberally treated in the matter of manure the results are extremely satisfactory.

Prairie-grass when included in a permanent-pasture mixture and grazed on the ordinary lines has not been a success, generally speaking, because all classes of stock relish it so much that it is eventually killed by constant close grazing. On the other hand, the writer is quite convinced that this grass has considerable possibilities if certain measures are adopted.

If pastures which consist principally of prairie-grass be not eaten too closely and are allowed an occasional spell, or, better still, if the pastures be divided into small areas and the stock moved from one to the other in rotation, a large number of cattle or sheep may be carried, particularly in winter-time. Of course, the above rule may be applied with success in grazing all pastures, but in a lesser degree. Some varieties of prairie-grass do not show the true permanent character, and a selection has lately been made at Ruakura which promises improvement in this direction. As far as the writer knows, there is no drill on the market which can sow and cover this seed effectively, but good results may be had by sowing it broadcast by hand, after the roller, then discing, chain-harrowing, and again rolling the land. From 35 lb. to 40 lb. of seed per acre should be used. The variety usually sown is *Bromus unioloides*. When hay is made of this grass care should be taken that it is not allowed to approach the ripe stage before cutting, otherwise the quality of the hay will be very indifferent.

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An all-steel silo is being erected at the Moumahaki Experimental Farm.

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A new variety of wheat from Italy being tested at the Ruakura Farm of Instruction gives evidence of great drought-resisting powers.

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At the Ruakura Farm of Instruction a small area of chou moellier has stood the drought well and is nearly fit for cutting. Apart from this, lucerne is the only successful fodder crop this season. It has been used for soiling purposes for the past four months.

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In connection with the Ontario Agricultural College, Guelph, Canada, the Massey Estate provided shares of Massey-Harris stock, amounting in value to £20,000, to be used as a fund to assist worthy students of the college. From this fund students are allowed to borrow what they require to enable them to finish their course, to be paid back, without interest, within one year after graduation. Upwards of one thousand students have received assistance in the ten years the fund has been available.—*Agricultural Gazette of Canada*.

## BLACKBERRIES:

### THEIR CONTROL AND ERADICATION.

R. E. FAIRFAX-CHOLMELEY.

OF the many losses that farmers are subjected to there is none greater than that caused by weeds. Not only is there a serious loss by the weeds taking up the room of useful grasses, but there is the additional loss of valuable time in controlling and eradicating them. The blackberry is one of the worst of these pests, and is very hard to get rid of. It is spreading over a wider area every year owing to the seeds being carried by small birds, which are increasing fast. It is safe to say that if it were not for these birds there would have been no difficulty in controlling blackberries.

Unfortunately, there is no easy method of eradicating the weed; it is a matter of hard and continuous work. Sprays of different kinds have been tried, but have been invariably found to be too costly to be practicable. If the land is flat the plough is recognized as the only practical method, but it must be used in a proper manner. It is useless to plough once, put in a crop of swedes, and then sow in grass. The land should be kept under cultivation for at least three years, using crops that require constant intercultivation or occupy the land for a short time. Frequent cultivation and summer fallowing are the secrets of success.

Oats are an excellent crop to grow. These can be sown in the autumn, fed off, and then cut for a crop, the land being then ploughed and worked in the summer, when it will be ready for soft turnips or other crops. When finally sowing in grass only sow down for one or two years' lay, using the roller and plenty of manure, for the thicker the sole of grass the less room there will be for blackberries.

On bush farms that are ploughable and are badly infested by weeds it is advisable to clear all stumps and logs, ploughing up as much land as possible every year and sowing in temporary pasture until the whole is cleared. By this means an increase of feed is obtained for the stock, a most important item, while the weeds can be kept in check by the use of the mower until such time as the land can be gradually and thoroughly worked.

If the ground is not ploughable the best procedure will be to divide it into small paddocks and stock heavily with sheep and goats. Goats have been used with very beneficial results in Taranaki, but it is useless to expect good work from these unless they

are fenced on to the land in small paddocks. Mr. H. Lepper's farm, near New Plymouth, is an excellent example of what can be done by stocking with goats. Five years ago the greater part of this farm was covered with logs and blackberries, some of the bunches on the stumps being as high as 8 ft. Now the blackberries have been eaten right down, and all the bunches are much weaker; some have rotted away. Not only has there been a large saving in labour (Mr. Lepper not having had to cut any blackberries since the time the goats were put on four years ago), but the carrying-capacity of the farm has been also increased, and, again, Mr. Lepper has been able to spend the time that the black-



GOATS FEEDING ON BLACKBERRY.

berries took to cut in ploughing, stumping, and improving his farm. This is not an isolated case. Many others can be quoted as showing the valuable work done by goats where the farms are subdivided and properly fenced. Goats adequately controlled are undoubtedly one of the best means of keeping down blackberries in rough country.

On river-banks and rough waste land of poor grazing-value the growing of such trees as *Pinus muricata* will be found more profitable than grazing sheep and endeavouring to keep down blackberries. The timber will be of ever-increasing value and will keep down all weeds.

## AUCKLAND EXHIBITION GRASS-PLOTS.

### REVIEW OF THE RESULTS OBTAINED.

R. W. GUNSON, Auckland.

A REVIEW of the grass and clover plots laid down on the 16th September, 1913, in the Auckland Exhibition grounds should be of more than passing interest to the majority of the readers of the *Journal of Agriculture*. The land is of similar quality throughout—rich volcanic loam with clay subsoil, at a varying depth of from 12 in. to 18 in. From the time of sowing to the closing of the Exhibition, a period of eight months, all plots received an abundance of water in addition to the natural supply by rainfall, which for the period was above the average. Since the closing of the Exhibition no water has been applied artificially, and the rainfall has been considerably below the average. The following figures, kindly supplied by Mr. T. F. Cheeseman, serve to illustrate this fact:—

#### RAINFALL STATISTICS.

The number of inches registered are as follows:—

|                   | 1911. | 1912. | 1913. | 1914.  |
|-------------------|-------|-------|-------|--------|
| January .. .. .   | 1.25  | 1.75  | 2.64  | 1.32   |
| February .. .. .  | 1.76  | 3.62  | 1.38  | 1.66   |
| March .. .. .     | 2.32  | 6.12  | 2.34  | 2.22   |
| April .. .. .     | 7.43  | 5.58  | 1.48  | 4.21   |
| May .. .. .       | 5.52  | 1.56  | 4.37  | 4.71   |
| June .. .. .      | 5.39  | 5.46  | 1.47  | 3.32   |
| July .. .. .      | 1.63  | 4.97  | 4.37  | 4.08   |
| August .. .. .    | 3.23  | 3.60  | 5.74  | 1.16   |
| September .. .. . | 2.70  | 5.53  | 1.76  | 1.45   |
| October .. .. .   | 4.67  | 2.09  | 3.69  | 1.15   |
| November .. .. .  | 4.14  | 1.97  | 6.16  | 1.41   |
| December .. .. .  | 5.06  | 0.81  | 2.80  | ..     |
|                   | 45.10 | 43.06 | 38.20 | 26.69* |

It will be seen that while in the first eight months of their growth the supply of moisture was much above the average, it was during the last four months negligible.

While in several of the plots the results have afforded both new ground for investigation and further possibilities in old fields, yet in the majority of cases the experiments exemplify with increased force the conclusions drawn from numerous experiments in other districts.

\* December yet to be recorded.

The grasses of poor and useless quality will be dealt with first. The figures against each represent the weight of the cuttings from each plot from the 16th September, 1913, to the 16th September, 1914. The plots were all of equal size, and about 1,070 of them would equal in area one acre.

#### GRASSES USELESS UNDER ALMOST ANY CIRCUMSTANCES TO THE NEW ZEALAND FARMER.

*Keeled Brome-grass* (*Bromus carinatus*) (17 lb.).—Growth practically nil.

*Pacific Brome-grass* (*Bromus pacificus*) (11½ lb.).—Growth practically nil.

*Yellow Oat-grass* (*Avena flavescens*) (15 lb.).—No growth since winter; herbage now entirely faded away.

*Canary-grass* (*Phalaris canariensis*) (19½ lb.).—An annual plant, therefore not showing now.

*Blue-tussock* (*Poa Colensoi*) (20 lb.).—At no time of vigorous growth; showing to best advantage now, and will improve.

#### GRASSES OF VALUE IN CERTAIN SITUATIONS, BUT DANGEROUS TO USE INDISCRIMINATELY AND WITHOUT A KNOWLEDGE OF THEIR HABITS.

*Awnless Brome-grass* (*Bromus inermis*) (13 lb.).—Showed inferior growth throughout the year, and now showing small growth above ground; but the rooting-capacity is intense, making it a valuable binding-grass in drifting country, at the same time giving a certain amount of forage of medium quality. Dangerous in ploughable land.

*Meadow Rice-grass* (*Microlaena stipoides*) (19½ lb.).—The growth has been fair, but is now entirely withered up. Dangerous on sheep-country, on account of the sharp arrow-like seeds penetrating the pelt of the sheep.

*Rhodes-grass* (*Chloris gayana*) (40 lb.).—The showing of this grass has been good throughout, as also the weight returns. It now shows an excellent flush of green growth, but of a somewhat harsh nature. Its partiality for prolonged heat precludes its use in New Zealand except in the north, while its intense creeping growth, by means of which it can oust anything but grasses of a similar nature, precludes its use except as a binder on country which will not hold the better grasses.

*Tall Fescue* (*Festuca elatior*) (92 lb.).—Far in the van of most other grasses as regards growth, this grass, while dormant for three

months in the winter, came away with great rapidity in the spring, and even now shows not the slightest distress at the dry weather experienced. A note of warning should always be sounded against sowing this grass anywhere but on high dry country. The seeds are easily carried by various agencies. If rich, moist country adjoins or is near to tall-fescue areas the fescue frequently takes charge of the better land. Once established in such a situation it is most difficult of eradication, and often spreads to the permanent and increasing detriment of the pasture.

GRASSES OF A SECONDARY PASTURE VALUE, BUT HAVING A  
CERTAIN USE.

*Bromus Schraderi* (28 lb.); *Bromus giganteus* (14 lb.); *Bromus unioloides* (17 lb.).—These three grasses are all found on the market under the name of "prairie-grass." In the plots the growth throughout has been very similar, but each is now feeling the prejudicial effects of the dry weather. The foliage of these is exceedingly succulent, and in a hay-paddock they would give good returns on account of their upright growth; but they are of short-lived value in general pastures, as they will not survive close feeding. In plantations and other enclosures they find their true place.

*Fiorin* (*Agrostis alba*) (16 lb.); *Creeping-bent* (*Agrostis alba stolonifera*) (22 lb.); *Red-top* (*Agrostis vulgaris*) (16 lb.).—Though low in gross-weight returns, the bents have all done well throughout the trials, though making a poor showing at present. *Agrostis stolonifera* now carries the best appearance. These grasses can in no way be properly judged when grown alone, as their true place is in forming a small proportion of the sward, excepting upon really first-class land, where they need not be sown. It is much to be regretted that neither colonial brown-top nor imported brown-top (*Agrostis canina*) found a place in the trials. Experience of many years has proved that where the seed of the latter grass is included in mixtures at the rate of from  $\frac{1}{4}$  lb. to  $\frac{1}{2}$  lb. per acre on the majority of Auckland soils it serves as a bottom grass and fills up bare places around the base of the tufts of rye-grass and cocksfoot to greater advantage and benefit to the pasture than any other variety. Only on heavy dry soils is it advisable to make heavier sowing of these grasses.

*Agrostis minutiflora*.—A few plants of this variety were propagated in a half-plot. The result tends to prove that this variety is superior to any other of the *Agrostis* family for laying down bowling-greens. Further experiments would be welcomed in many

quarters. Throughout the long dry spell to which it has been subjected it shows little signs of drying off.

*Tall Oat-grass (Avena elatior)* (29 lb.).—Of tall, upright growth, this grass gave a splendid showing of upper leaves but no growth near the base. Came away well after winter, and cut good weight of good quality. Of value purely as a hay grass.

*Phalaris bulbosa* (43 lb.).—The phenomenal returns claimed for this grass on its introduction have not been substantiated throughout these trials. Giving fair growth in the winter, its total period of profitable growth was so small as to warrant its being relegated to quite a secondary position. Its appearance at the close of the dry spell is decidedly unsatisfactory. As far as Auckland is concerned, its inclusion in pastures is not worthy of consideration. In plantations and other enclosures it might find a suitable place with prairie-grass.

*Phalaris arundinacea* (42 lb.); *Phalaris caroliniana* (46½ lb.).—Though not showing to such advantage throughout the winter, the aggregate results were similar to those of *Phalaris bulbosa*.

*Paspalum virgatum* (47 lb.).—Maintaining a vigorous green appearance throughout, this grass is yet of very doubtful value in any part of New Zealand. Its upright growth precludes its use in pasture, and for hay the foliage on drying is extremely coarse. In the plot it was very slow in coming away after the winter. The leaves were badly affected by wind; no stoloniferous growth is showing.

*Paspalum digitaria* (30 lb.).—This grass is now showing well, though in winter it was at a standstill. Growing very close to the ground, its chief quality from a farmer's standpoint is its ability to stand constant flooding, and for growing on river-banks and lands liable to be washed away it would be hard to find its superior.

*Paspalum distichum*.—Growth practically identical with *P. digitaria*.

*Poa compressa*.—It is unfortunate that this variety was not true to type, practically half the plot being *Poa pratensis*, so that a correct comparison with other varieties cannot be formed. Though the individual *P. compressa* plants have throughout shown well in bulk and fair in quality, the aggressive creeping habits of this grass have proved it as likely to be even more troublesome than *P. pratensis* on ploughable land. On bush land the latter would be infinitely the better grass of the two. The winter growth of *P. compressa* was superior to that of *P. pratensis*.

*Eragrostis (Poa) Brownii* (36 lb.).—This native grass has shown poor-quality returns throughout the trials. It is now showing at its best, and is seeding very prolifically. The only place where it can be profitably sown is on the dry poor lands of the north, and here its value is open to debate.

*Yorkshire Fog (Holcus lanatus)* (150 lb.).—The total weight cut from this plot is indeed remarkable, equalling over 72 tons per acre. However, the quality was similar to that which is so well known—of little value for feeding purposes. Undoubtedly the investigator who discovers a variety of *Holcus lanatus* free from hairs and of good or even fair quality will place a grass of exceedingly great value at the disposal of the farming community of the world.

*Various-leaved Fescue (Festuca heterophylla)* (24 lb.).—Has shown throughout to equal advantage with the other small-leaved fescues. Growth in winter fair. Appearance now commencing to fade off.

#### GRASSES OF RECOGNIZED FIRST-CLASS PASTURE VALUE.

(N.B.—Allowance must here be made for the vastly differing conditions of New Zealand pastures.)

*Perennial Rye-grass (Lolium perenne)* (24 lb.).—The seed for this plot was of South Island origin. Unfortunately, no Poverty Bay seed was sown. The results from this plot are disappointing, though rye-grass is certainly never seen to best advantage when grown alone and allowed to seed. The seeding has taken the vitality out of the plants, and the appearance now is poor. This merely serves to emphasize the folly of what is repeatedly done—allowing rye-grass to go to seed the first season after sowing.

*Italian Rye-grass (Lolium italicum)* (38 lb.); *Giant Italian Rye-grass* (37½ lb.); *Perennialized Italian Rye-grass* (32 lb.).—These three plots were practically identical throughout in both growth and appearance. Of the three it will be noticed that the ordinary variety seed purchased in the open market has given best returns. Each now bears a dejected appearance, the “perennial” variety giving promise of dying off with the others.

*Western Wolths Grass (Lolium westwoldicum)* (40 lb.).—This variety has certainly given a better yield than any of the aforementioned three plots of rye-grass. It came to seed twice during the first eight months and died completely away in the winter, thus proving itself a true annual.

*Cocksfoot (Dactylis glomerata)* (36 lb.).—The vigour of this grass has been well up to expectations throughout, and it now shows

the value of its deep-rooting system in that the grass carries a better appearance than almost any of the other plots. The dry weather has affected only the surface growth; the roots exist in all their vigour, ready upon the first application of moisture to display instant vigorous growth.

*Crested Dogtail (Cynosurus cristatus)* (20 lb.).—Satisfactory in growth throughout the trials, but unable to stand the dry period. It has faded away above ground, though still very strong in the root and ready to come away again with moisture.

*Meadow Foxtail (Alopecurus pratensis)* (30 lb.).—Showing to great advantage throughout the Exhibition, and well up in cutting-weight. Has seeded very prolifically, and is now throwing seed of about 90 per cent. kernel. Lacking moisture this plant has completely died away. It is much to be regretted that large quantities of seed of this grass are annually allowed to go to waste in New Zealand.

*Timothy (Phleum pratense)* (40 lb.).—Cutting a heavy crop of excellent quality, its summer growth was good. Since the winter moisture has been insufficient, with the result that there has been no growth.

*Paspalum dilatatum* (60 lb.).—This plot, though very slow in germinating, once it became established made a very rapid show and grew with great rapidity throughout last summer. It stood the winter better than anticipated, always carrying a good green appearance. The growth is both low and high, and the ground is completely covered. The rooting has taken its characteristically intense hold of the ground, and there is little hope for anything growing with it. On account of its short period of growth in cool climates this grass is of no real value south of Tauranga and Raglan. *Paspalum* is giving excellent returns in the warmer climate of the north. A knowledge of its habits is essential prior to sowing this grass. Once established it is practically impossible by ordinary methods to eradicate it.

*Poa trivialis* (32½ lb.).—This grass made wonderful growth in the winter, exceeding all the plots for that period. It is now faded, but showing signs of rapid growth with the first rains. This is undoubtedly one of the best pasture-grasses we have, alike for quality of herbage, bulk produced, and winter growth.

*Poa nemoralis* (42 lb.).—This plot has been remarkable for the vigour of its growth throughout, and at the present time, in spite of the dry spell and heat, shows to as good advantage as any of the plots. The roots have obtained a very powerful hold of the ground.

*Poa pratensis* (*Kentucky Blue-grass*).—This plot shows a growth which upholds the reputation it has as a “bottom” grass on permanent-pasture land. Its powerful rooting system renders its inclusion in ploughable land undesirable. This plot is now showing signs of that bad habit common to many creeping grasses when sown alone—viz., choking itself out. This is a trouble not experienced when sown with other grasses.

*Hard Fescue* (*Festuca duriuscula*) (20 lb.); *Chewing's Fescue* (*Festuca rubra* var.) (32 lb.); *Red Fescue* (*Festuca rubra*) (26 lb.); *Various-leaved Fescue* (*Festuca heterophylla*) (24 lb.); *Wakeman's Fescue* (*Festuca arenaria*) (48 lb.).—The results of these plots have upheld the results obtained at Ruakura and elsewhere in showing a more vigorous growth and higher weight returns for Wakeman's fescue than for any of the others. Seed of this variety should be made available, as it is undoubtedly superior to any of the other fine-leaved varieties. Chewing's fescue was very backward in the winter, but made vigorous early growth, and is now showing to advantage.

*Meadow Fescue* (*Festuca pratensis*) (62 lb.).—This grass responded wonderfully to the abundant application of moisture in the early months, and has throughout given most excellent returns. Its great value should be more widely known and appreciated.

#### CLOVERS.

Of the three varieties of white clover the results are both interesting and instructive.

*Webb's Giant White* has done poorly, being badly affected by drought and wind, but it has seeded prolifically.

*Lodino White* has also given poor results, on account of the lack of moisture during latter months, while ordinary white clover purchased in the open market has made a good show throughout and is now doing well in spite of dry weather.

These results, together with those obtained with giant and perennialized Italian rye-grass, go to prove that while a selected variety may give excellent results in the district where it is raised, it by no means follows that similar results will be obtained in another climate and under other conditions or under practical methods of use.

*Lucerne*.—Of the thirteen plots of lucerne, all are showing to advantage after the winter, and are standing the dry weather well.

Arabian and Peruvian had no period of rest during the winter.

The varieties which have given best returns are Peruvian, Hunter River, Tamworth, Marlborough, Spanish, in the order given.

Of the *Lotus* family,—

*Lotus corniculatus* is standing dry weather really well, and its cutting returns were heavier than those of *Lotus major*. It is undoubtedly a variety which could be more extensively sown to advantage. It is quite free from hairs.

*Lotus major* has given excellent returns, being more branching than *Lotus corniculatus*.

*Lotus angustissimus* gave a very heavy crop, but from base to tip was one mass of hairs, which except when the plant is full of moisture are exceedingly distasteful to stock. Though giving such heavy returns its value is restricted to certain areas of heavy poor soil, and even here it is to be doubted whether better returns could be obtained from it than from plants giving feed less in bulk but higher in quality.

*Boyd's Clover* throughout the trials was identical with *L. angustissimus*. The tendency of these plants to hairiness may diminish on certain soils.

The plots, situated as they are in such close proximity to the Auckland City, are undoubtedly of great value to the community. At the present time they are not open to the public and their continuance is much in doubt. Were they to be closed a very valuable and instructive medium of education as to the relative merits of many grasses and plants would be lost to farmers and many others interested.

[Since the above article was written the work has been discontinued, the local authorities having declined to contribute to the cost of maintenance.—ED.]

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Hop-growing is developing in the Motueka district. Last year 1,915 bales were exported, or 83 bushels more than in the previous year.

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This season there have been supplied from the poultry section of the Ruakura Farm of Instruction 1,255 doz. eggs for breeding purposes, an increase of 102 doz. on last season's record.

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The progress of fruitgrowing in the Motueka district—which for this purpose is taken to include the Moutere country—is indicated by the following figures supplied to me by Mr. Moffatt, Secretary of the Motueka Harbour Board: Despatched over the Motueka wharf for the year ended 31st December, 1914, 227,360 bushels, against 143,229 bushels for the previous year, an increase of 84,131 bushels in the twelve months.

—T. W. K.

## DAIRYING IN SWITZERLAND.

W. WRIGHT.\*

### BROWN SWISS CATTLE.

ONE of the most interesting subjects of study in Switzerland is the race of cattle known as Brown Swiss. I had the pleasure of inspecting a noted herd of the breed, that of Mr. Burgi Gretner, of Arth.

Owing to the fact that the herd was then grazing on the alpine pasturage of Rigi, at an altitude of from 5,000 ft. to 6,000 ft., it was necessary to reach the summit of the mountain, which was accomplished by taking the funicular railway from Vitznau. The herd, which is composed of animals of the recognized pure Brown Swiss breed, numbers in all some two hundred head, there being at the time of my visit sixty cows, eighty heifers, forty young bulls, and twenty female calves, and also a few aged bulls. The aim of the breeder has been to rear hardy and vigorous animals. As soon as the grass is growing—that is to say, about the end of March—the cattle are turned out to graze, first on the rich lowlands (420 metres high), then, from the end of April, successively higher up, so that in June the cattle are grazing on alpine pasture lands at a height of 1,600 to 1,800 metres (5,300 ft. to 6,000 ft.). The exercise in the pure and healthy air of the mountains, necessitated by walking on a rugged ground, and the action of the various atmospherical influences impart strength and activity to the cattle. From the end of August the migration takes place just in the opposite way, but more quickly, so that in the beginning of October all the herd, except about fifty young heifers which winter on the mountains, graze anew on the lower grounds. From the end of October, towards the beginning of winter, the animals are fed on dry fodder and are given the hay gathered on the meadows of the valley whilst the cattle are on the alpine pasture-grounds.

All the animals, including those on the alpine pastures, are groomed every day. Their hoofs are closely inspected and trimmed three or four times a year. The mating takes place in January and February and March, so that calving should take place at the end of the autumn or in winter. The calves grow in good con-

\* New Zealand Dairy-produce Inspector, London.

dition during the winter if they are well looked after, and are sturdy enough when spring comes to endure the fatigue of the summer's sojourn on the Alps. In this way the young bulls acquire until the autumn, which is the sale season, the qualities required to fit them as good bulls ready for breeding purposes. The young bulls are given daily 8 litres (nearly 2 gallons) of full milk for eight to ten months; sometimes full milk is replaced after four or five months, at the very least, by skimmed milk, and the feeding is completed with crushed oats. The food of the female calves consists daily of about 2 gallons of new milk for about four months, then the allowance is progressively reduced, and no more milk is given after six months.

I think it would not be out of place for me to mention here that before the bulls of this breed can be looked upon as "pedigreed," the animals must be examined by official inspectors, who, if satisfied with the result, give certificates that guarantee the pedigree of the animals passed. This means that unless owners can produce the necessary certificates their animals are not looked upon as "pedigreed," no matter how pure they may be along breeding lines.

The Brown Swiss cattle are not used for draught purposes, as are the Simmental breed, probably on account of their lighter build of body.

Market values of Brown Swiss cattle in this locality are approximately £15 to £20 for two- to three-year-old heifers, £28 to £35 for four-year-old cows, and £80 to £200 for bulls, according to age and quality.

Of the three breeds of Swiss dairy cattle, the Brown Swiss commends itself more to the notice of New Zealand dairymen than do the Simmental or Fribourg breeds, owing to the fact that in the dairy Shorthorn and Friesian the New-Zealander already has in the Dominion very efficient substitutes for the two heavy breeds of Swiss cattle—namely, the Simmental and Fribourg. The Brown Swiss, however, is a hardy type of animal that is suited to the hilly or broken country of the Dominion. Its natural habitat being the Swiss Alps, it was necessary for breeders to create a type of animal of dairy worth which at the same time had sufficient bone and substance to enable it to move freely over the high and broken country without undue fatigue. After probably centuries of systematic breeding on the part of Swiss breeders this object has been attained.

I am of the opinion that when New Zealand dairy-farmers are looking round for such a breed of dairy cattle the merits of the Brown Swiss deserve more than passing attention.

## THE MONASTERY OF EINSIEDELN.

An instructive visit was paid to the monastery of Einsiedeln, to inspect the farm buildings and stock. For nearly a thousand years the monastery has been rearing cattle of the Brown Swiss type, and also pigs. The breeding of pigs, however, was only commenced recently, with the object of keeping up the stock of pigs to be fattened, a certain number being always kept by the monastery. At the present time there are altogether about a hundred and fifty pigs that are kept for breeding and fattening purposes.



A BROWN SWISS BULL.

The green and dry fodder are supplied by the abundant meadows and the fine pasture lands which belong to the monastery. The hay, which is gathered in by means of the most modern implements, is placed in six barns which are situated in different parts of the estate, from which barns the hay is taken when required. During the summer months most of the cattle graze on alpine pasturage owned by the monastery, seven miles and a half from Einsiedeln, at the foot of a mountain called Fluhberg. From a hundred and eighty to two hundred head of cattle, of which eighty to ninety are cows, were there at the time of my visit. During the greater part of the year the whole of the milk (210,065 litres—42,000 gallons—in 1913) is used principally for feeding purposes, either for rearing the

young cattle or for the household in the monastery, which consists of about a hundred friars, from sixty to seventy servants, and two hundred and twenty pupils (boarders). The pasture lands on the heights around the monastery are chiefly used for the breeding and rearing of horses. The grazing-area is such that, besides the foals of the monastery, from thirty to forty other foals can be turned out to graze there during the summer. The monastery actually owns about fifty horses, out of which a dozen are brood mares; the others are either foals or horses used for various works in connection with the monastery.



A BROWN SWISS COW.

As most of the stock, which included the dairy herd, had been removed to the Alps for the summer season, we were unable to see the whole of the cattle owing to the fact that the time was not at our disposal to follow the cattle up to the high country; but we saw a sufficient number of cows, bulls, and young stock to give us a very good idea of the high standard of excellence that has been attained through centuries of consistent breeding.

#### LUCERNE MILK-SUPPLY COMPANY'S DEPOT.

The construction of the above company was undertaken to ensure a pure and reliable milk-supply for the City of Lucerne.

The peculiarity about this company, however, is the fact that its membership is drawn from the milk-consumers of Lucerne, and is not, as is the general custom, composed of dairy-farmers.

There are twelve thousand shareholders in this company, all of whom may be said to be persons who require a daily supply of milk and who are townspeople. The value of the shares when issued was rs. 8d. (2 francs); after an existence of nine years the company was able to return to the shareholders  $7\frac{1}{2}$  per cent. profit on the original share capital for the last financial year. When the company first started operations the daily turnover of milk was about 660 gallons; at the time of my visit 2,090 gallons per diem were being received. No butter or cheese is made on the premises, the supply of milk drawn from the farms being regulated by the demand for the town milk-supply. The company, however, purchases both butter and cheese, which are again disposed of to their customers. In addition to the retailing of milk, kephir, yoghurt, and pasteurized milk are also dealt with, but the sale of pasteurized milk is not encouraged, it being thought best to deliver the milk to customers in its natural state.

The milk-supply is drawn from an area within a radius of 15 kilometres of Lucerne, and is obtained from about a hundred and fifty farmers, whose dairy herds range in number from six to sixty cows. Agreements made with the company require all milk to be filtered through cotton-wool on the farms, more stress being laid on this feature than on the cooling of the milk. The temperature of the milk on arrival at the depot is generally about  $15^{\circ}$  C., but varies according to the season of the year. It is also on record that no sour milk has ever been delivered by any farmer. Filtering through cotton-wool is looked upon as being more hygienic than is the case when milk is strained through cloths. The wool is not used for more than one milking at a time, it being destroyed after use. The degree of cooling the milk receives at the farm is regulated by the temperature of the water-supply. There is a well-equipped laboratory in the depot, where weekly determinations are made of all suppliers' milk, for dirt-content. Although the company does not pay out on the fat-content of the milk received, regular tests are made to find out and record the fat-values of each lot of milk. 3 per cent. is the minimum required by law in Switzerland. Bacteriological and chemical examinations are also carried out in the laboratory. The quality of all products sold by the company is controlled in the laboratory. All the cows in the dairy herds from which the supply of milk is drawn by this company are submitted to the tuberculin test once every six months. A clinical examination is also made at the same time. Any supplier found to be

delivering dirty milk is warned to improve matters, and is given two chances, but if he offends the third time his milk is returned to him. If the milk, however, is at all fit for use of some kind it is taken from the farmer, but at a lower price. The farmer is paid about  $8\frac{1}{2}$ d. per gallon for his milk, and the milk is retailed by the company at about 1s. per gallon. The average cost of transport from farm to depot is fixed at 1 per cent. per litre. The milk is received at the depot, weighed, and sampled in the usual way. It is then elevated to the next floor; and here I wish to draw particular attention to the fact that, instead of using a pump of any kind for that purpose, twin lifts are used, each lift being fitted with a 200-gallon tinned-steel vat, and when the lift comes to a rest on the receiving-floor it sinks into a depression sufficiently deep to allow the milk to flow from the receiving-vat into the vat on the lift. I was much impressed with the sound reasoning behind this method of elevation, and commend it to the notice of those interested in the Dominion. After being elevated as before described, the milk runs again into a large receiving-vat, thence over a cooler fitted with water and brine connections, and the milk is reduced in temperature  $3^{\circ}$  to  $4^{\circ}$  C., after which it is ready for delivery to the customers. Milk is delivered twice daily in the summer, but only once daily during the winter months. The method of delivering the milk is by the usual tinned-steel cans with a capacity of about 8 to 10 gallons, except in the case of children's milk, which is delivered in bottles.



MILK-PORTAGE IN SWITZERLAND.

The company have customers that are prepared to pay a higher price for the milk for the children's needs. The milk for this class of trade is drawn from herds that are specially selected for the purpose. The herds selected are fed on dry feed only, and the farmer receives about 1s. 8d. per gallon for this special milk. This is retailed at 2s. 11d. per gallon, and always in bottles.

Inspectors are employed to visit the dairy farms when occasion requires: these are selected from the most experienced and practical men available. Inspection-work is treated here more in the light of

assistance to farmers to overcome difficulties than in the coercive sense. Emphasis is laid upon the fact that all men for this class of work must be tactful, but at the same time well versed in all matters relative to their calling.

In concluding this article I must make mention of the method adopted in drying all dairy utensils, which is by means of a steam-heated chamber. Nothing in the form of a cloth or any other drying-medium is allowed to come into contact with the tinware after scalding, the operation of cleaning being completed in the hot-air chambers.

## THE PUREBRED FLOCKS.

### POSITION OF THE DIFFERENT BREEDS IN NEW ZEALAND.

JOHN LINTON, Feilding.

As in the past, the accompanying tables showing the progress of the various breeds registered in the flock-books have been compiled by copying the breeders' returns in the latest flock-books—namely, the Romney Marsh Flock-book, Vol. x, 1914; the North Island Flock-book, Vol. xiii (New Series), 1914; the New Zealand Lincoln Flock-book, Vol. iii, 1912-13; and the South Island Flock-book, Vol. x, 1914. Although these volumes bear different dates the information with regard to returns are for the same year—that is, the lambs kept as rams are for 1913 lambing: therefore they appear in the tables as two-tooths.

It will be understood the returns of stud sheep by the Department of Agriculture include those registered in the flock-books, and also only give the total number of lambs (rams and ewes), so that the number of ram lambs on the 30th April, 1914, is arrived at by halving the number of lambs.

The most notable feature shown by a study of the tables is that breeders, especially those having registered flocks, are becoming more conservative, in that they are not increasing their output of rams to any extent, and it would be to the best interests of the Dominion should breeders of what are termed "flock rams"

adopt the same policy. Perhaps the high prices now ruling for lamb and mutton will have the desired effect.

It is regrettable to notice that owners of breeds new to New Zealand are neglecting to send in returns to enable one to judge how they are progressing.

In order to estimate the rams likely to be available during the coming season the figures in the tables require to be discounted by a percentage for deaths, old age, and culls. Still, allowing 33 per cent. for old age, it will be seen that with the number of two-tooths available there will still be a large number over the requirements.

#### PROGRESS OF THE BREEDS.

##### *A Synopsis of the New Zealand Flock-books.*

| Breed.               | Number of Flocks. | Breeding-ewes. | Increase. | Decrease. | Two-tooth Rams. | Increase. | Decrease. |
|----------------------|-------------------|----------------|-----------|-----------|-----------------|-----------|-----------|
| NORTH ISLAND.        |                   |                |           |           |                 |           |           |
| Romney .. ..         | 258               | 36,885         | 3,052     | ..        | 15,354          | 248       | ..        |
| Lincoln .. ..        | 117               | 17,602         | 2,190     | ..        | 6,738           | 537       | ..        |
| English Leicester .. | 22                | 1,778          | ..        | 375       | 457             | ..        | 380       |
| Border Leicester ..  | 11                | 841            | 9         | ..        | 424             | 22        | ..        |
| Southdown .. ..      | 73                | 7,435          | 704       | ..        | 3,100           | 87        | ..        |
| Shropshire .. ..     | 8                 | 470            | ..        | 281       | 190             | ..        | 115       |
| Ryland .. ..         | 4                 | 67             | 10        | ..        | 21              | 8         | ..        |
| South Devon .. ..    | 1                 | 57             | 13        | ..        | 21              | 3         | ..        |
| Totals, 1914 ..      | 494               | 65,135         | 5,978     | 656       | 26,305          | 905       | 495       |
| .. 1913 ..           | 467               | 59,813         | ..        | ..        | 25,895          | ..        | ..        |
| SOUTH ISLAND.        |                   |                |           |           |                 |           |           |
| Romney .. ..         | 134               | 19,779         | 1,079     | ..        | 8,057           | 46        | ..        |
| Lincoln .. ..        | 16                | 1,920          | ..        | 138       | 910             | 20        | ..        |
| English Leicester .. | 121               | 19,223         | ..        | 277       | 7,511           | ..        | 629       |
| Border Leicester ..  | 176               | 20,542         | 335       | ..        | 9,047           | 287       | ..        |
| Southdown .. ..      | 52                | 5,337          | 796       | ..        | 1,846           | 31        | ..        |
| Shropshire .. ..     | 37                | 3,635          | 29        | ..        | 1,303           | 94        | ..        |
| Merino .. ..         | 20                | 7,825          | 24        | ..        | 2,477           | 84        | ..        |
| Ryland .. ..         | 3                 | 159            | ..        | 238       | 53              | ..        | 115       |
| Corriedale .. ..     | 24                | 11,190         | 2,415     | ..        | 3,654           | 503       | ..        |
| Oxford Down .. ..    | 1                 | ..             | ..        | 72        | ..              | ..        | 5         |
| Totals, 1914 ..      | 584               | 89,610         | 5,178     | 725       | 34,858          | 1,065     | 749       |
| .. 1913 ..           | 563               | 85,157         | ..        | ..        | 34,542          | ..        | ..        |
| Half-bred, 1914 ..   | 1                 | 3,399          | ..        | ..        | No return       | ..        | ..        |
| .. 1913 ..           | 2                 | 3,198          | ..        | ..        | 1,436           | ..        | ..        |

## A COMPARATIVE TABLE,

*Showing the Proportion of the Different Breeds registered in the Flock-books as compared with the Returns by the Department of Agriculture of Stud Sheep on the 30th April.*

| Breed.               | Breeding-ewes. |              | Two-tooth Rams. |              | Sheep Returns. |             |
|----------------------|----------------|--------------|-----------------|--------------|----------------|-------------|
|                      | Sheep Returns. | Flock-books. | Sheep Returns.  | Flock-books. | Stud Rams.     | Flock Rams. |
| NORTH ISLAND.        |                |              |                 |              |                |             |
| Merino .. ..         | 1,680          | Nil          | 790             | Nil          | 84             | 5,524       |
| Romney .. ..         | 63,679         | 36,885       | 26,532          | 15,354       | 4,018          | 104,011     |
| Lincoln .. ..        | 26,638         | 17,602       | 9,908           | 6,738        | 1,801          | 33,532      |
| English Leicester .. | 2,422          | 1,778        | 1,000           | 457          | 185            | 3,749       |
| Border Leicester ..  | 2,806          | 841          | 861             | 424          | 142            | 3,725       |
| Southdown .. ..      | 10,995         | 7,435        | 3,695           | 3,100        | 594            | 13,896      |
| Shropshire .. ..     | 1,605          | 470          | 511             | 190          | 171            | 1,796       |
| Other breeds .. ..   | 1,526          | 124          | 594             | 42           | 85             | 2,455       |
| Totals, 1914 .. ..   | 111,351        | 65,135       | 43,891          | 26,305       | 7,080          | 168,688     |
| „ 1913 .. ..         | 109,315        | 59,813       | 42,947          | 25,895       | 7,992          | 166,518     |
| SOUTH ISLAND.        |                |              |                 |              |                |             |
| Merino .. ..         | 15,087         | 7,825        | 4,242           | 2,477        | 772            | 13,660      |
| Romney .. ..         | 28,925         | 19,779       | 10,929          | 8,057        | 2,133          | 34,553      |
| Lincoln .. ..        | 2,589          | 1,920        | 965             | 910          | 333            | 3,095       |
| English Leicester .. | 20,582         | 19,223       | 6,648           | 7,511        | 1,078          | 30,034      |
| Border Leicester ..  | 26,916         | 20,542       | 10,327          | 9,047        | 1,035          | 30,715      |
| Southdown .. ..      | 5,232          | 5,337        | 1,799           | 1,846        | 161            | 2,011       |
| Shropshire .. ..     | 4,974          | 3,635        | 1,662           | 1,303        | 219            | 4,836       |
| Other breeds .. ..   | 13,399         | 11,349       | 4,612           | 3,707        | 574            | 20,892      |
| Totals, 1914 .. ..   | 117,704        | 89,610       | 41,184          | 34,858       | 6,305          | 139,796     |
| „ 1913 .. ..         | 118,873        | 85,157       | 40,852          | 34,542       | 5,164          | 134,016     |

The need and advantages of the more complete subdivision of the average farm into smaller paddocks has been consistently advocated in the *Journal*, but it is a fact that few of the younger farmers—and not many of the older ones, for that matter—can tell you where the principal gain comes in. Most in reply will say, “Yes, I like to have an occasional change of feed,” or that “an extra paddock is handy.” Both are very good reasons, but the advantages do not end there. Heavily grazed paddocks shut up for, say, ten days for the first time during any part of the growing season will make a growth of, we will say, 3 in.; the next five days they will show an almost equal growth, making 6 in. in all. This for the reason that, the plants being allowed to develop, growth is stimulated and the stooling process promoted. Again, after a reasonable grazing, the grass will make a much faster growth after the field has been shut up for the second time than it did after the first period of rest, growing-conditions being the same. Once this principle is recognized it is easy to see that the stock will get more and fresher feed by a continuous change of paddock.—*Aorangi*.

## PASTURES.

### ESTABLISHMENT AND MANAGEMENT OF THE PERMANENT PASTURE.

R. E. FAIRFAX-CHOLMELEY.

PERMANENT pastures are a dominant feature of New Zealand agriculture, and their character has an important influence on the wealth-creating power of the Dominion. Yet, important as they are to the individual and the country, it is comparatively seldom a pasture is met with which is of the highest feeding-value and contains only useful plants. It is not too much to say that the bulk of our permanent pastures are not producing the grasses they should be, and are full of weeds. The reasons for this are many. Among the chief causes are want of drainage and absence of lime; neglect of the necessary care in seeding—the use of inferior and unsuitable seeds of poor germination and low vitality—stocking too early and too heavy; and in some cases, particularly in the North Island, the want of manuring on soils where plant-food is deficient.

The laying-down of a permanent pasture is an expensive work, and on light land it is often an impossible undertaking. It will, on such lands, be more profitable to lay down a temporary pasture of from two to four years' lay. It is doubtful if it pays to sow down a permanent pasture on the greater area of the land of New Zealand, temporary pastures having so many advantages coming earlier to hand for grazing, and when broken up having a store of humus to enrich the soil.

Should it be decided to sow a permanent pasture, no pains or expense should be spared to get the land in good heart, and this cannot be done unless your land is properly drained and sweet. In nearly every case a dressing of lime is required. The land should be ploughed deep, the depth depending on the thickness of the top soil—in no case should the subsoil be brought to the top—then harrowed and worked to a fine tilth and well rolled, a clean firm bed being most necessary.

In laying down a permanent pasture consideration has to be given to the nature of the soil—whether heavy, medium, or light—and to climatic influence, as well as the employment of suitable grasses and

the quantities required for the variety of soil. Many grasses suitable for a heavy soil would be next to useless on a sandy soil, and *vice versa*; therefore it is impossible to recommend one mixture which will suit all lands. The farmer will act wisely if he carefully examines the neighbouring pastures, especially the hayfields, and notes the grasses doing best. Hayfields are specially mentioned, as in the grazing-pastures the best and sweetest grasses are often eaten so close that they are overlooked, while the coarse and more unpalatable grasses being rejected show up the best.

The sowing can be broadcasted, the work being done with a barrow sower or drill. There is a difference of opinion as to which is the better. If the spring or autumn is dry and the land light the drill has a decided advantage. The seeds germinate well and stand the dry weather better, the covered drills protecting the seed from the sun and giving it a more certain access to moisture. If the drill is used the coulters should be set as close together as possible and the seed sown shallow. The ordinary drill as used in New Zealand has coulters set 7 in. apart. This is too wide, the weeds being thereby allowed to grow between the drills. Roll the ground after sowing. If the seed is broadcasted or is sown with a barrow sower, a brush harrow should be used after the sowing and the land then rolled.

No pains should be spared in endeavouring to obtain a good sole of grass. With this object in view it will be found advisable to cut the grass when about 6 in. high. Let it then lie, and roll the ground. By this means a quicker and better sole will be obtained.

During the first two years the grass should be cut early for hay, and on no account should it be allowed to seed. The aftermath can be grazed, but care must be taken not to over- or under-stock. By overstocking the roots of the grass are exposed to the sun, and are thus damaged by burning in the summer or pulled and trodden out in the winter; by understocking the grasses go to seed, which always weakens and often kills the finer grasses.

After grazing for a time the chain harrows should be run over the land at least once a year to spread the manure. The roller should be then used.

Generally speaking, and more especially in the North Island, the land should have a light top-dressing of suitable manures every year, it being unreasonable to expect to continually take fertility from the land without returning it in some form. It will be found more profitable to keep your land in good heart by a frequent dressing of manure than to try and renew a worn-out pasture with a heavy dressing.

There is land in New Zealand, especially in the South Island—Southland and Otago—that has been in permanent pasture for over thirty years and has never had a dressing of fertilizers, yet the pastures are said to be as good as when laid down; but this land is exceptional. Not only in New Zealand, but also in Great Britain, it has been found necessary to top-dress pastures.

### SOWING AND TREATMENT OF THE TEMPORARY PASTURE.

A temporary pasture is the only form of pasture which should be used on the light lands of New Zealand. Indeed, it will be found on arable land, in nine cases out of ten, that it will pay far better to sow a temporary pasture of from two to four years' lay, then to sow a permanent one. Many of the grasses selected for a permanent pasture are slow in maturing, some of the fine grasses taking three or four years, while in a temporary pasture fast-growing grasses can form the basis of the mixture, bringing a quick return. The breaking-up of the land every few years for cropping and regrassing helps to sweeten the land, improves the drainage, and adds to the store of humus. Temporary grasses in rotation with crops necessitate the addition and use of artificial manures: the land is kept in good heart, and the pastures give a maximum yield: thus temporary pastures are the backbone of the small farmer, especially the milk-producer.

As with a permanent pasture, the preparation of the land is of the greatest importance. The land must be properly drained and sweet, worked to a fine tilth, and rolled so that the seed-bed is firm. The selection of the seed depends on the length of the lay in addition to the climatic influences. Early maturing varieties should be selected as well as clovers. The chief object is to quickly produce heavy crops. The pastures require the use of the brush harrows to spread the manure. They should be rolled in the spring and carefully stocked, care being taken not to allow the grass to run to seed. Neither should they be overstocked, otherwise the grass will be pulled out by the roots or trodden out.

In conclusion, from the above it will be gathered that, except on exceptionally rich land, where the grasses hold well, temporary pastures have a great advantage, especially where the holding is small and dairying is carried on.

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It is now conservatively estimated that there are 1,000,000 horses engaged in the war.—*Agricultural Gazette*.

## MUSTARD.

W. S. HILL, B.Agric.

Of the minor supplementary forage crops of New Zealand mustard is deserving of more consideration. The variety at present most widely cultivated is White mustard, while the Smooth-leaved Elephant-ear and the Curly-leaved Elephant-ear mustard are of apparently recent introduction. The purpose of cultivation is for forage or green-manuring.

White mustard is an extremely rapid-growing plant which reaches the flowering stage when from 2 ft. to 4 ft. high in from eight to ten weeks from date of sowing. It is the practice in most parts to sow about 1 lb. an acre with the rape crop. Although White mustard matures some three weeks before the rape is in fit condition to be stocked, yet the sheep soon exhibit their preference for the former. Occasionally it is cross-drilled, broadcasted, or sown on the headlands after the rape is well up, thus ensuring that the two crops mature more nearly at the same time. The presence of the White mustard in the rape crop acts as a corrective for digestive and other disorders in the sheep, besides being of considerable nutritive value, as the following analysis from Kellner's tables shows:—

|                      |    | Water.    | Crude Protein. | Crude Fat. | Nitrogen-free Substances. | Crude Fibre. |
|----------------------|----|-----------|----------------|------------|---------------------------|--------------|
|                      |    | Per Cent. | Per Cent.      | Per Cent.  | Per Cent.                 | Per Cent.    |
| Crude nutrients      | .. | 85.1      | 2.9            | 0.4        | 7.3                       | 2.9          |
| Digestible nutrients | .. | ..        | 1.9            | 0.2        | 4.9                       | 1.5          |

White mustard broadcasted and disced in on the oat, wheat, or barley stubble at the rate of from 10 lb. to 15 lb. per acre usually supplies an abundant wealth of fodder during autumn. The self-sown cereal assists to thicken the crop, which may be utilized for flushing ewes at tupping-time, or be ploughed under as green manure. The latter is the practice adopted at Moumahaki Experimental Farm when red clover has not been sown with the cereal. He would be very unlucky who secured so poor a crop as not to benefit both the land and his pocket by this practice.

MUSTARD AT MOUMAHAKI EXPERIMENTAL FARM.



WHITE  
MUSTARD.

SMOOTH-LEAVED  
ELEPHANT-EAR.

CURLY-LEAVED  
ELEPHANT-EAR.

SIXTY-SIX DAYS' GROWTH.



CURLY-LEAVED  
ELEPHANT-EAR.

SMOOTH-LEAVED  
ELEPHANT-EAR.

WHITE  
MUSTARD.

IN THE TESTING-PLOTS.

Latterly two varieties of black-seeded mustard have come under our notice. Of the various names which have been appended to these varieties, Smooth-leaved Elephant-ear mustard and Curly-leaved Elephant-ear mustard appear to be the more appropriate. Seed of the latter was forwarded by Inspector Cholmeley under the name of Japanese spinach. This variety has been grown in combination with rape, as it was anticipated that on account of its slower maturing nature both varieties of plant would be fit for feeding at the same time. The mustard matured slightly before the rape, and had commenced to flower. The latter condition was hastened by the plants being overcrowded.

Sheep did not seem to appreciate the Elephant-ear mustard so well as the rape, and on this trial was inferior to White mustard on that account. Reports of its use when sowing bush burns indicate that the plants develop rapidly, reach a large size, and are the first fodder sought after by sheep. Should any readers desire to experiment with Elephant-ear mustard in this direction and report results, a limited number of samples will be available from Moumahaki Experimental Farm. In gardens there is liability for this plant to become a weed if allowed to seed, but on grazing-lands there is no such danger.

The Elephant-ear mustards give promise of being useful as green-manure crops. As yet no experiments for this purpose have been completed. The value of White mustard has been frequently demonstrated. In this season's green-manuring experiments White mustard was sown on the 9th April at the rate of 10 lb. per acre. On the 27th August—140 days' growth—the crop stood 3 ft. 6 in. high and averaged 9.45 tons of green material per acre.

In this season's variety trials the undermentioned crops were sown in drills, and, with the exception of White mustard, were thinned. (Sown 13th October; cut and weighed 18th December. Period of growth, sixty-six days.)

|                                    |    |    |    | Tons per Acre |
|------------------------------------|----|----|----|---------------|
| Broad-leaved Essex rape            | .. | .. | .. | 5.57          |
| Giant rape                         | .. | .. | .. | 3.86          |
| Curly-leaved Elephant-ear mustard  | .. | .. | .. | 9.00          |
| Smooth-leaved Elephant-ear mustard | .. | .. | .. | 8.57          |
| White mustard                      | .. | .. | .. | 12.43         |

The mustards serve useful purposes (1) as correctives with other fodder crops, (2) as catch-crops for fodder or for green-manuring.

## TESTS OF SPRAYING-COMPOUNDS.

### INTRODUCTORY.

A CONSIDERABLE number of experiments have been inaugurated throughout the Dominion in the testing of various spraying-compounds. The reports of these experiments, carried out by growers in co-operation with the Orchard Instructors and the Managers of the experimental farms, should prove of considerable interest and value to fruitgrowers throughout the Dominion. It will be noted that all the different districts of the Dominion are represented in these reports, and also that the reports as to the value of some spraying-compounds differ both with regard to district and season. This is accounted for by the varying climatic conditions both in district and season that occur throughout the Dominion. It may be as well to explain that reports on the tests of spraying-compounds are only published after at least two seasons' operations. This will account for the fact that reports of tests of one season's duration only are not published in this issue.

### INSECTICIDES.

#### BERGERS' "MERCURY" ARSENATE OF LEAD.

##### WERAROA EXPERIMENTAL FARM.

*Season 1910-11* : Mixes well and does not burn the foliage. Adheres well to the fruit, heavy rain following soon after. the spray had dried, making no apparent difference. *Season 1911-12* : Used for codlin-moth and pear-leech. Very little codlin-moth here, but appears to be very effective. Destroys leech. Does not remain so long in suspension as Swift's or Blue Bell. An agitator necessary. Burning of foliage not more than other brands.—*J. Drysdale, Manager.*

##### WAERENGA EXPERIMENTAL FARM.

*Season 1910-11* : Four trees were selected and sprayed thoroughly on the following dates : 10th and 26th November, 16th and 30th December, and 17th January. The fruit was gathered on 20th February, 1911. Result : From 75 to 85 per cent. sound fruit, the remainder being moth-infested. *Season 1911-12* : Twelve trees sprayed on 14th and 28th December, 15th January, and 6th February. About 30 per cent. of sound fruit, the rest being very badly affected with moth. 1½ lb. to 36 gallons water used.—*J. F. Shepherd, Manager.*

#### BLYTH'S "BLUE BELL" ARSENATE OF LEAD.

##### WERAROA EXPERIMENTAL FARM.

*Season 1910-11* : Mixed more freely than Swift's, and remained in suspension very well. Has not burned the foliage. Was used on trees that were infected with moth previously. So far not one apple has been lost, though there are signs that the grubs have been poisoned. *Season 1911-12* : Used for codlin-moth and pear-leech. It appeared to be very effective, and was very good to use, as it remained a long time in suspension.—*J. Drysdale, Manager.*

## HEMINGWAY'S ARSENATE OF LEAD.

## RUAKURA EXPERIMENTAL FARM.

*Season 1910-11* : A large Beurre Diel pear-tree was sprayed on 7th November and afterwards at intervals of twenty days, the last spraying being made on 13th February. The tree carried a heavy crop (4 cwt. 1 qr.), and only seven were found to be infected with codlin-moth. On cutting the fruit the grubs appeared very small, and had only recently entered the fruit.—*T. W. Lonsdale*, Manager.

*Season 1913-14* : Gave entire satisfaction on all trees sprayed. Used on several varieties of apples, including Romanite, which easily scorches, but no scorching of foliage was evident, the results being highly satisfactory. Strength used was 3 lb. to 50 gallons water, and the fruit was perfectly free from codlin-moth.—*Primrose McConnell*, Manager.

## TAURANGA EXPERIMENTAL FARM.

*Season 1910-11* : Eight rows of apples and three rows of pears were sprayed with this mixture five times during the season, at the rate of 1½ lb. to 40 gallons of water. None of the foliage was scalded, and it seemed to give good results.—*W. C. Berridge*, Manager.

## LAWES' ARSENATE OF LEAD.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13* : Mixed well. Good for codlin-moth, but fruit much russeted, and foliage badly burnt, except on some trees not reached by early morning sun.—*J. Drysdale*, Manager.

## ARATAKI EXPERIMENTAL FARM.

*Season 1912-13* : Gave every satisfaction.—*T. E. West*, Manager. *Season 1913-14* : Sprayed on apple-trees. Found it mixed with water readily, more so than usual, but has poor powers of suspension, requiring extra agitation. In controlling codlin-moth it seems to be on a par with other leads.—*W. H. Taylor*, Manager.

## HASTINGS.

*Season 1912-13* : Used in conjunction with "Anti-Blight." Apples free from scab and practically free from codlin-moth. Rather badly russeted and foliage somewhat scorched. Pears free from scab and moth, and russetting not noticeable.—*J. A. Campbell*, Orchard Instructor.

## NELSON.

*Season 1912-13* : As effective as other brands used. Showed no signs of burning foliage. *Season 1913-14* : Tested on fruit-trees. Mixed and held well. Quite efficacious against codlin-moth. Caused no damage to foliage.—*J. H. Thorp*, Orchard Instructor.

## CHRISTCHURCH.

*Season 1912-13* : Trees sprayed very free from moth. No burning of foliage took place. *Season 1913-14* : Results not very satisfactory. Did not seem to have satisfactory killing-power.—*W. J. Courtier*, Orchard Instructor.

## VREELAND'S "ELECTRO" ARSENATE OF LEAD.

## WAERENGA EXPERIMENTAL FARM.

*Season 1911-12* : Twelve trees sprayed with this mixture on the following dates : 14th December, 28th December, 15th January, and 6th February. 90 per cent. of sound fruit harvested. 1 lb. to 50 gallons of water used. *Season 1913-14* : Apple-trees were sprayed for codlin-moth with satisfactory results, obtaining about 90 per cent. clean fruit.—*J. F. Shepherd*, Manager.

## RUAKURA EXPERIMENTAL FARM.

*Season 1913-14* : Results generally satisfactory, and although several varieties were sprayed there was no sign of leaf-scorch on most of the trees. Apples sprayed with 1½ lb. to 100 gallons of water without lime, and no scorching resulted. When lime was added results were the same. It thoroughly controlled codlin-moth and leech, and also caterpillars on tomatoes. It gave good results when mixed with Bordeaux mixture.—*Primrose McConnell*, Manager.

## ROGERS' ARSENATE OF LEAD AND LIME-SULPHUR SOLUTION.

## WERAROA EXPERIMENTAL FARM.

*Season 1911-12*: Used on pears. For control of scab on Bon Chretien was found to be effective. Quite young foliage was burned to some extent, but not seriously, while older foliage was not injured. If any russetting it was to a very minor extent. Used without arsenate for control of red spider on apple-trees this was effective, and did no injury to apple-foliage. It may be remarked that the winter spray with red-oil—1 in 15 to 17—will destroy the eggs of the red spider, and that the summer treatment will only occasionally be necessary. *Season 1913-14*: Rogers' lime-sulphur solution used on apple-trees at 1 in 33. It effectively controlled red spider and codlin-moth, and caused no burning of the foliage. Roger's lead arsenate mixed freely with water, adhered well to the foliage, and did not burn. Used on pear-trees infected with leech it gave very satisfactory results. —J. Drysdale, Manager.

## WAERENGA EXPERIMENTAL FARM.

*Season 1911-12*: Twelve trees sprayed on 14th December, 28th December, 15th January, and 6th February.  $1\frac{1}{2}$  gallons lime-and-sulphur mixture used and 3 lb. arsenate of lead. About 80 per cent. sound fruit. *Season 1913-14*: Lime-sulphur solution was used on trees at 3 gallons solution to 100 gallons water. Several trees showed scab badly. Lime-sulphur and arsenate of lead was used for the control of codlin-moth, apple and pear scab, at the rate of 3 lb. lead and 3 gallons lime-sulphur to 100 gallons water. About 85 per cent. of clean apples and 95 per cent. of clean pears.—J. F. Shepherd, Manager.

## RUAKURA EXPERIMENTAL FARM.

*Season 1911-12*: Received on 21st November. A report on its value alone for controlling apple and pear scab this season is not conclusive, as owing to its late arrival all trees had been previously sprayed with Bordeaux mixture. After discontinuing Bordeaux and using this solution scab did not appear. For control of codlin-moth it proved effective, no sign of grub being found in fruits from trees sprayed. Used at the rate of 3 lb. arsenate to 50 gallons, young leaves of Rhodes Orange apple, Romanite, and Adams' Pearmain scorched. Apple of Commerce, Gravenstein, and Springdale did not suffer. Bordeaux mixture had previously caused russetting of the fruit. *Season 1913-14*: Tests carried out on apples, pears, peaches, and nectarines. Winter spray, 1 gallon to 10 gallons water; summer spray, 1 gallon to 33 gallons water, and  $1\frac{1}{2}$  lb. arsenate of lead to 25 gallons water. Excellent results followed application of spray on pears, and the only unmarketable fruit was gathered from Williams' Bon Chretien variety, 2.7 per cent. being spotted. The first and second summer sprayings on apples resulted in scorching of foliage on Springdale, Romanite, and Rhodes Orange, but other varieties did not suffer. The percentage of unmarketable fruit due to black-spot alone rose higher than that following the application of Bordeaux with every variety. The colour of fruit sprayed with Rogers' solution was considerably brighter. Completely controlled red mite, which other sprays did not do. Leaves were much darker green in colour, and thus it had great advantage over Bordeaux mixture. No fruit on any of the trees sprayed with Rogers' lime-sulphur combined with arsenate of lead was affected with codlin-moth, but as this orchard has had annual sprayings for five years the chance of infection is not so great. For prevention of leaf-curl on peaches and nectarines poor results were obtained.—Primrose McConnell, Manager.

## HASTINGS.

*Season 1913-14*: This arsenate of lead gave every satisfaction, and can be used at  $1\frac{1}{2}$  lb. to 2 lb. to 50 gallons of water. Kills well at strength mentioned and does no harm to foliage. Trees sprayed with  $2\frac{1}{2}$  lb. to 50 gallons water gave a practically clean crop, as not more than 1 per cent. was affected. Rogers' lime-sulphur for apple and pear scab is a good preventive at 1 in 86 to 1 in 100, and does not burn foliage at 1 in 100. Used with success throughout, but at 1 in 70 to 1 in 75 it scorches the foliage. It is not equal to the Bordeaux in checking scab on fruit already infected. For mildew 1 in 100 checked the spread with one spraying, but two or three sprayings have done little good when applied late to trees badly infected. For red spider at 1 in 110 apples and pears have been successfully sprayed, also peaches at 1 in 100 to 1 in 160. For vines the spray gave satisfaction in controlling mealy bug.—J. A. Campbell, Orchard Instructor.

## SHERWIN WILLIAMS' ARSENATE OF LEAD.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13* : Used for codlin-moth and leech, and was effective without scorching the foliage. Mixed very readily, and remained in suspension better than is usual for such mixtures.—*J. Drysdale, Manager.*

## WAERENGA EXPERIMENTAL FARM.

*Season 1912-13* : On 25th November was tested combined with lime-sulphur solution at  $1\frac{1}{2}$  gallons lime-sulphur, 3 lb. arsenate of lead, to 50 gallons water. Severe scalding resulted. Evidently mixture was too strong. Sprayed later on same trees, using  $1\frac{1}{2}$  lb. of arsenate of lead. Results were very satisfactory. About 96 per cent. of clean fruit resulted. *Season 1913-14* : Sprayed on apple and pear trees, and very good results were obtained. Five applications were made, and about 95 per cent. of clean fruit resulted.—*J. F. Shepherd, Manager.*

## RUAKURA EXPERIMENTAL FARM.

*Season 1912-13* : Experiments not extensive enough to warrant recommendation for use, but was very effective in controlling codlin-moth. *Season 1913-14* : This was used in conjunction with lime-sulphur and controlled codlin-moth, but scorching of foliage resulted. All the fruit from the apple-trees was clean, but the orchard has received sprays for five consecutive years, hence the chance of infection is less.—*Primrose McConnell, Manager.*

## ARATAKI EXPERIMENTAL FARM.

*Season 1912-13* : Was best of three arsenates of lead used, adhering well and being most effective. Trees were very clean and were free from codlin-moth. Consider mixture gave very satisfactory results.—*T. E. West, Manager.*

## AUCKLAND.

*Season 1913-14* : This was sprayed on apple-trees with power sprayer, and seven applications were made for codlin-moth at  $3\frac{1}{2}$  lb. to 100 gallons of water. It was quite effective without any scorching, and hardly one case of mothly apples could be found. When used with lime-sulphur, 2 gallons to 100, woolly aphids was checked.—*W. R. L. Williams, Orchard Instructor.*

## HASTINGS.

*Season 1913-14* : Was about equal to Rogers' arsenate of lead, and is recommended for use. It gave every satisfaction at  $1\frac{1}{2}$  lb. to 2 lb. to 50 gallons of water, and one orchard sprayed three times is practically free from moth. It also did well combined with lime-sulphur, 1 to 100, or Bordeaux mixture, 3-4-50.—*J. A. Campbell, Orchard Instructor.*

## "GARGOYLE" RED SPRAYING-OIL.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13* : At 1 in 16 this spray was ineffectual for scale. Had the same effect on woolly aphids as all such mixtures have—viz., killed all it touched. Consider it a well-mixed compound.—*J. Drysdale, Manager.*

## WAERENGA EXPERIMENTAL FARM.

*Season 1912-13* : When tested for mussel scale it killed all, but did not prove effective for red spider. Probably better results would be obtained with stronger formula. *Season 1913-14* : Sprayed on apple-trees for mussel scale and American blight at 1 in 12, but had very little effect on scale. It checked American blight for a short time.—*J. F. Shepherd, Manager.*

## RUAKURA EXPERIMENTAL FARM.

*Season 1912-13* : Was effectual in removing mussel scale and white wax scale, particularly the former, on apples and pears. Checked woolly aphids slightly, also red spider. Consider one application is insufficient. It should be applied again during autumn.—*A. W. Green, Horticulturist.*

## HASTINGS.

*Season 1913-14* : Gargoyle at 1 in 12 and 1 in 14 emulsified with soap gave very satisfactory results in killing scale.—*J. A. Campbell, Orchard Instructor.*

## WELLINGTON.

*Season 1913-14*: Used for mussel scale and red spider with very good results. It mixed excellently with cold water.—*T. C. Webb, jun.*, Orchard Instructor.

## PHYTONAL INSECTICIDE.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13*: This was used for powdery mildew on apples, and appeared to be of use, but wet weather prevented conclusive trial.—*J. Drysdale*, Manager.

## WAERENGA EXPERIMENTAL FARM.

*Season 1913-14*: This mixture was applied for American blight and red spider on apple-trees but unsatisfactory results were obtained.—*J. F. Shepherd*, Manager.

## FUNGICIDES.

## LAWES' ANTI-BLIGHT.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13*: Effective for powdery mildew on apples and tomatoes and scab on pears. *Season 1913-14*: Spray was used on badly blighted tomatoes with satisfactory results.—*J. Drysdale*, Manager.

## WAERENGA EXPERIMENTAL FARM.

*Season 1912-13*: Absolute failure when used for blight on potatoes, the whole crop being lost. Did not check scab on pears at all. *Season 1913-14*: The specific was an absolute failure in checking scab on badly affected pear-trees. Vines were sprayed for black-spot and mildew. Several of the vines were clean, but a good many were still affected.—*J. F. Shepherd*, Manager.

## HASTINGS.

*Season 1912-13*: Compares favourably with other fungicides for control of tomato-mould. Was effective in checking scab in apples and pears, arsenate of lead being added for the control of codlin-moth. *Season 1913-14*: Gave as much satisfaction as Copper's and Bordeaux mixture as a summer spray for trees, but failed to control Irish blight in potatoes. On peach-trees was also equal to Bordeaux mixture in controlling peach-curl.—*J. A. Campbell*, Orchard Instructor.

## NELSON.

*Season 1912-13*: Equal to Bordeaux mixture for control of tomato-blight. *Season 1913-14*: Tested for Irish blight on potatoes and checked the disease somewhat. On other plants young which were not affected at the time, very little of the disease developed after the application. Was not tested on fruit-trees.—*J. H. Thorp*, Orchard Instructor.

## CHRISTCHURCH.

*Season 1912-13*: Fairly successful in preventing pear-scab, apple-spot, and Irish blight on potatoes. *Season 1913-14*: Tested for pear-scab and potato-blight, and gave fair results at strength 1 in 10 and 1 lb. in 5 gallons, but the latter scorched the foliage. Does not adhere like Bordeaux mixture.—*W. J. Courtier*, Orchard Instructor.

## SHERWIN WILLIAMS' LIME-SULPHUR SOLUTION.

## WERAROA EXPERIMENTAL FARM.

*Season 1912-13*: Used for red spider and powdery mildew. Killed mites, but almost entirely defoliated trees. At reduced strength two-thirds was ineffective and caused a large loss of foliage. *Season 1913-14*: This was sprayed on apple-trees infected with red spider at 1 in 50. The spider was controlled, but the foliage was scorched. It was not effective on scale at the same strength.—*J. Drysdale*, Manager.

## WAERENGA EXPERIMENTAL FARM.

*Season 1912-13*: Used combined with arsenate of lead on 25th November at 1½ gallons lime-sulphur, ½ lb. arsenate of lead, to 50 gallons water. Severe scalding resulted. Evidently mixture was too strong. Sprayed on same trees

later, when 1½ lb. arsenate of lead was used. Results very satisfactory; about 96 per cent. of clean fruit resulted. *Season 1913-14*: Was sprayed on pear-trees at 3 gallons lime-sulphur to 100 gallons water, but several trees showed scab although five sprayings were applied.—*J. F. Shepherd, Manager.*

#### RUAKURA EXPERIMENTAL FARM.

*Season 1912-13*: Controlled scab on pears but not on apples, and the trees sprayed are not as healthy as those sprayed with Bordeaux paste. *Season 1913-14*: Lime-sulphur was sprayed on dormant trees at winter strength, with very satisfactory results, but at the summer strength the only one variety sprayed (*Directeur Hardy*) was scorched. All the fruit was clean and of a fine colour. Did not do as well on pears as prepared Bordeaux paste, but on apples it completely controlled red mite and was superior to any other spray. Lime-sulphur and arsenate of lead combined scorched the trees. The cause may thus be attributed to the arsenate.—*Primrose McConnell, Manager.*

#### ARATAKI EXPERIMENTAL FARM.

*Season 1912-13*: Was effective in checking peach-curl, with no scorching of foliage, and is a first-class mixture for apple-mildew. Consider mixture gave very satisfactory results.—*T. E. West, Manager.*

#### AUCKLAND.

*Season 1913-14*: When used at 1 in 40 and 1 in 50 it showed no reduction of mussel scale and red spider on the trees, and the foliage was badly scorched. A grower here sprayed half his orchard, resulting in the half which was sprayed being almost free from scab, while the other half was badly affected. When used by another grower at 1 in 50 it was quite ineffective and burned the foliage considerably. When used with arsenate of lead for woolly aphis and spider it kept the former in check but had no effect on the latter. Strength used 2 gallons to 100 of water.—*W. R. L. Williams, Orchard Instructor.*

#### HASTINGS.

*Season 1913-14*: Lime-sulphur proved satisfactory, and is recommended for general use. It was equal to Rogers' lime-sulphur. Proved satisfactory for control of apple and pear scab and mildew, but did not check disease on fruit. In one instance it was used at 1 in 60 for red spider and it completely controlled it. Did well when combined with arsenate of lead with sulphur, 1 to 100, or Bordeaux mixture, 3-4-50.—*J. A. Campbell, Orchard Instructor.*

#### WANGANUI.

*Season 1913-14*: This spray was tried by three growers. The first tried it at 4 in 28 for winter and 1 in 25 summer spray. Winter sprayings were applied, then summer, and the result was that the pears which were sprayed gave a clean crop free from scab and russet without harm to the foliage. A second grower tried it and it also gave very good results, producing the cleanest crop yet seen in the orchard. A third grower tested it under unfavourable circumstances, the surroundings being very damp and thus favourable to disease. It caused the foliage to drop badly, but he attributes this to surroundings, as in drier localities the wash was entirely satisfactory.—*W. C. Hyde, Orchard Instructor.*

#### SHERWIN WILLIAMS' BORDEAUX MIXTURE.

##### WAERENGA EXPERIMENTAL FARM.

*Season 1913-14*: Did not give any satisfactory results when sprayed on vines for black-spot and mildew, both of which showed freely after the application.—*J. F. Shepherd, Manager.*

##### RUAKURA EXPERIMENTAL FARM.

*Season 1912-13*: Used effectively for control of scab on Williams' Bon Chretien pears. *Season 1913-14*: Sprayed on dormant trees at winter strength and gave good results on pears, controlling all diseases with no scorching, and greater crops of pears were obtained than with lime-sulphur, but on apples the results were reversed. It effectively controlled black-spot, but the fruit was not so well coloured as it was when lime-sulphur was used.—*Primrose McConnell, Manager.*

## CERTIFICATES IN SPRAYING AND PRUNING.

T. W. KIRK.

IN the December, 1913, issue of the *Journal* there was published a list of candidates who had passed the annual examination conducted by the Orchards, Gardens, and Apiaries Division of the Department in spraying and pruning.

The value of these examinations is becoming well recognized both by persons possessing small or domestic orchards and by those who desire to undertake the care of such properties.

This year thirty persons notified their intention of sitting, and of these twelve sat and eight passed the examination. A number withdrew, as they felt they did not possess sufficient knowledge of the various subjects, and desired to study further with the view of coming up for examination next year.

The following is a complete list to date of all those to whom the certificate has been issued:—

### SPRAYING.

Boniface, H. A. J., Ormond, Gisborne.

### SPRAYING AND PRUNING.

Archer, J. R. H., 695 Colombo Street, Christchurch.  
Berridge, Charles, Tauranga.  
Biggar, W., Hillwood, Whakapuaka.  
Bloxham, Albert, Craigielea Farm, Rcefton.  
Brine, J., Wanganui East.  
Brown, N. B., Wanganui East.  
Burrow, L. H., Tauranga.  
Clark, S. A., Rangiora.  
Cunningham, William, Wai-iti Road, Timaru.  
Edwards, A. W., Pigeon Valley, Wakefield.  
Hadfield, A. R., Kent Street, Carterton.  
Harrow, C. C., 71 Middleton Road, Christchurch.  
Hayward, F. H., Kaikoura.  
Kalashnikov, N., Havelock North.  
Kalaugher, J. P., Devonport, Auckland.  
Lambert, A. E., Waimauku.  
Mackenzie, Thomas, Cromwell.  
Mackillop, R., Marton.  
Mathieson, L. A., Wakatu, Napier.  
Paynter, L., Stoke, Nelson.  
Shailer, George, Hokowhitu, Palmerston North.  
Skelhorn, R., 114 Ghuznee Street, Wellington.  
Smith, R., Motueka, Nelson.  
Strachan, James, Kihikihi.  
Thorne, Frederick A., 45 Princess Street, Christchurch.  
Todd, J. H., Little River.  
Turner, B. T., 34 Broad Street, Woolston.  
Whelan, J. W., Feilding.



A PORTION OF A LINE OF CROSSBRED WETHERS AT THE WERAROA EXPERIMENTAL FARM.

The 225 wethers were bought at 21s. 4d. a head; they gave a gross return of 15s. 10d. The fleeces averaged 10 lb. and realized 12½d. a pound at auction. The carcasses averaged 80·9 lb. after the wethers were topped off on turnips, and were sold at 4d. a pound.

## PACKING AND MARKETING OF FRUIT.

### REQUIREMENTS OF THE ENGLISH TRADE.

W. K. DALLAS.

THE following interesting particulars relating to the marketing of fruit-packs were recently published in the *Journal of the Board of Agriculture of England* :—

The Board of Agriculture and Fisheries have for some time been in communication with a number of representative of fruit-buyers' associations in order to ascertain the views of the trade with regard to the packing of home-grown apples. The Board think it desirable that such information as they have been able to obtain should be brought to the notice of fruitgrowers.

**Net Weight of Fruit in each Package to be declared.**—It appears that the point on which retail fruit-dealers attach most importance is that every package should bear a label or label with the net weight or weight declared. The object of this requirement is to give the purchaser some security as to the amount of the goods he is purchasing. It is said to be impossible under existing conditions to estimate the amount with sufficient accuracy for the purposes of retail trade. The difficulty of complying strictly with this requirement is not underrated, but the views of the trade on the matter are so strong and so unanimous that it seems clear that it would be to the advantage of any grower who was in a position to do so to indicate in the manner suggested the net weight of packages of fruit sent to market.

**Label or Mark to denote the contents of Packages.**—Another point on which there appears to be little or no difference of opinion among buyers is that the initials of the grower or some distinguishing mark should appear on the package. The object in view is to facilitate the selection for purchase of apples supplied by growers who avoid the practice of "tipping." It is alleged that much loss and inconvenience is occasioned to retail buyers of fruit by this practice. There is no doubt that unmarked packages of fruit are in many markets viewed by buyers with a good deal of suspicion, and that a grower who had affix to his produce a mark which will be taken by the retail dealers attending the market as a guarantee that the fruit is really packed stands a much better chance than others of meeting with a ready sale. The practice of "tipping" not only deprives the buyer by leading him to pay a higher price for an article than it is worth, but puts him to great inconvenience because he finds himself with a short supply of the apples of the class he requires to meet the demands of his particular trade or customers, and at the same time has left on his hands a certain quantity of inferior apples for which he has no use, although in the hands of some other retailer they might have been disposed of without difficulty.

**Statement of Variety and Approximate Dimensions.**—There is also some evidence that preference would be given by purchasers to packages with labels stating in addition to the net weight, the variety of the apples and their approximate diameter.

The inquiries and correspondence related specifically to home-grown apples, but it is believed that the first two of the above requirements apply equally to all home-grown fruit.

In these days of keen competition in the fruit trade every improvement we can adopt to increase the popularity of our fruit on the world's markets should be taken advantage of. A knowledge of the requirements of those with whom we hope to do business is essential to success, and it is in this respect that the foregoing report is of value to the New Zealand fruitgrower, as it sets out plainly what is required in regard to the marking of fruit-cases for the English market by representatives of the fruit-buyers' associations in England. The information furnished is not new to us, but in this country it is not universally practised. The Home report is submitted in the hope that the suggestions it contains may be more generally adopted.

## EXPORT OF FRUIT.

T. W. KIRK.

It has been decided to offer again for the coming season a guarantee of 1d. per pound net return on all apples and pears exported from New Zealand to new markets, and to renew the offer of a guarantee of 1d. per pound net return, with a maximum of £150 payable thereunder, on peaches shipped to North America. There is no limit in connection with the guarantee on apples and pears. Both guarantees are offered on the same terms as those published in the December, 1913, number of the *Journal*. The conditions are as follow:

### GUARANTEE ON TRIAL SHIPMENTS OF APPLES AND PEARS MADE TO EUROPEAN AND NORTH AMERICAN MARKETS.

1. The guarantee shall be 1d. per pound net on all apples and pears accepted by the Inspector.

2. (a.) The varieties of apples shall be—

|                             |                     |
|-----------------------------|---------------------|
| Ribstone Pippin,            | Delicious,          |
| Cox's Orange Pippin,        | Scarlet Nonpareil,  |
| Wellington Pippin,          | Monroe's Favourite, |
| New York Pippin,            | Cleopatra,          |
| London Pippin (Five-crown), | Jonathan,           |
| Rymer,                      | Adams' Pearmain,    |
| Esopus Spitzenberg,         | Sturmer,            |

and such other *dessert* varieties as are approved by the Inspector.

2. (b.) The varieties of pears shall be—

|                    |                       |
|--------------------|-----------------------|
| Burre Easter,      | Josephine de Malines, |
| Beurre Bosc,       | L'Inconnue,           |
| Beurre Diel,       | P. Barry,             |
| Beurre d'Anjou,    | Vicar of Winkfield,   |
| Beurre Clairgeau,  | Winter Cole,          |
| Doyenne du Comice, | Winter Nelis,         |

and such other *dessert* varieties as are approved by the Inspector.

3. They shall be entirely free from insect pests, fungus diseases, or blemishes.

4. Apples shall be packed in the standard case adopted by the Hawke's Bay and Motueka Conference—viz., 18 in. by 14½ in. by 8½ in., inside measurement; or in the new case recommended by the Department—viz., 10 in. by 11½ in. by 19½ in.,

inside measurement. Thickness of timber: Heads,  $\frac{1}{2}$  in.; sides, tops, and bottoms,  $\frac{5}{16}$  in.

5. Pears shall be packed in single trays (holding one tier), the dimensions of which are  $2\frac{1}{2}$  in. by  $11\frac{1}{2}$  in. by  $10\frac{3}{4}$  in., inside measurement, three trays to be elated together making one case; or in the new half-case recommended by the Department, holding two tiers, inside measurement of case being 5 in. by  $11\frac{1}{2}$  in. by  $19\frac{3}{4}$  in.

6. All cases shall be new and legibly branded—

#### NEW ZEALAND APPLES.

One Bushel.

|         |                               |                    |
|---------|-------------------------------|--------------------|
| Grade : | { Special<br>Choice<br>Good } | No. of apples..... |
|---------|-------------------------------|--------------------|

[As the case may be.]

Together with such other particulars as the shipper desires. Shippers are, however, reminded that a simple brand is preferable.

Pears ditto.

*Special* grade shall consist of fruit free from disease and blemish, and exceptionally well coloured of its variety, and specially graded and packed.

*Choice* grade shall be free from disease and blemishes, but not so well coloured as *special*.

*Good* grade shall be free from disease and not more than 5 per cent. of blemish.

7. They shall be graded and packed to the satisfaction of the Inspector.

8. The size of apples shall be  $2\frac{1}{2}$  in.,  $2\frac{3}{4}$  in., 3 in.,  $3\frac{1}{2}$  in.,  $3\frac{3}{4}$  in. (nothing under or over these sizes will be accepted).

*Red varieties of apples*: Early shipments must show at least 65 per cent. of good colour; later shipments at least 75 per cent.

*Striped varieties of apples*: Early shipments at least 40 per cent. good colour; later shipments at least 50 per cent.

9. All consignments shall be shipped in cool storage.

10. Shippers shall make their own arrangements for shipment and for sale in Europe and North America.

11. The High Commissioner's officers and the New Zealand Government Agent in America shall be given facilities for inspecting and reporting on the fruit after arrival, and on the sale thereof.

12. In calculating the amount to be deducted for expenses, New Zealand freights and wharf charges shall be taken into consideration, but the cost of the case, labour, and packing shall not be taken into account.

13. Shippers must see that the labour necessary for handling the fruit, and for opening and closing cases for inspection, is provided.

14. All cases accepted for shipment under this guarantee will be branded by the Inspectors. Fruit passed for export but not under this guarantee will be certified, but not branded.

#### GUARANTEE ON TRIAL SHIPMENTS OF PEACHES MADE TO THE WEST COAST OF NORTH AMERICA.

A guarantee of 1d. per pound net return on shipments of peaches made during the coming season to the west coast of North America is also offered, the maximum amount payable being £150, and subject also to the following conditions:

1. That at least two shipments go forward, each consisting of not less than 250 cases.

2. That the fruit must be entirely free from disease.

3. That the peaches be packed in the single trays (holding one tier), the dimensions of which are  $2\frac{1}{2}$  in. by  $11\frac{1}{2}$  in. by  $10\frac{3}{4}$  in., inside measurement, three trays to be elated together to make one case; or in the half-case recommended by the Department, holding two tiers, inside measurement of case being 5 in. by  $11\frac{1}{2}$  in. by  $10\frac{3}{4}$  in. Fruit must be selected, packed, and graded to the satisfaction of the Government Inspector.

4. That the shippers make their own shipping arrangements, and that facilities be given for inspection by the New Zealand Government Agent on arrival in America.

5. That only such varieties be sent as are approved by the Government Inspectors.

6. Any case or cases rejected by the Inspector must be regraded and packed to his satisfaction, or withdrawn from the shipment.

7. The fruit must be shipped in cool storage.



HOW WOOLLY APHIS WILL POSSESS A TREE IF ALLOWED TO GO UNCHECKED.

## HARVESTING THE FRUIT CROP.

T. C. WEBB.

THE harvesting of the fruit will be now in operation with the earlier varieties of apples and pears, while in some districts the gathering of the peaches will be in full swing. It should be hardly necessary to emphasize that the proper picking of the fruit is the first step to successful marketing. The right time to pick depends greatly on the distance the fruit has to travel and the time that will elapse before it is finally marketed. Many growers, anxious to catch the early market, gather the fruit too early, with the result that it is not sufficiently matured, shrinking in consequence, and thus being very much reduced in selling-value when it is placed on the market. On the other hand, some growers store half-ripe fruit, often in poorly ventilated sheds, until late in the season, when it is too ripe for shipping, and arrives on the market in a bruised and sometimes rotten condition.

### THE TIME TO PICK.

With the smaller fruits the majority of these require to be picked on the green side. Indeed, gooseberries are profitably marketed when quite green. Strawberries should be allowed to have a fair amount of colour, but should not be ripe. In the case of raspberries the fruit should be ripe. They should not be picked till they begin to soften, when the berry can be easily removed from the stem. Currants should be taken when there is a fair amount of colour on them, but not when they are actually ripe. In the case of grapes these should always be well coloured before picking, but it takes a man of experience to determine when they are quite ready for market. The best guide is to taste them. Cherries may be allowed to remain on the trees till just before ripening. Here again the palate will be the surest guide as to their fitness for the market. Some varieties of plums may be picked when quite green, such as Japanese; but others, principally the English varieties, will shrivel up unless picked when almost ripe, but as these are generally shipped to near-by markets they can be rapidly disposed of. The best method to adopt with apricots to test their marketing stage is to place one between the first finger and the ball of the thumb, when if, on a very slight pressure, the surface is found to yield the fruit may be

considered to be in a good marketable condition. The marketing stage of peaches may be determined in the same manner. Apples are very seldom allowed to ripen on the tree, and the time to pick demands considerable judgment. A knowledge of the particular variety and its proper colour will be a great assistance in determination of the best marketing stage. It must be remembered that there are early, medium, and late varieties. The apple must have a fair percentage of its right colour. Some varieties may be gathered when the colour is only partly developed, as they will colour in storage, while others must have the colours well developed. Pears should never be allowed to ripen on the trees. They should be picked and stored, when ripening will gradually take place. In picking the fruit the stem should be firmly held and given a slight twist, when it will come away readily without damaging the spur. Most fruits should be picked with the stems on, as if the stem be removed a wound is left which is a prolific source of decay.

Fruit which should be picked with the stems on are apples, pears, plums, quinces, cherries, grapes, strawberries, gooseberries, and currants. The stems should be taken off apricots, peaches, and raspberries.

Ladders should always be used in picking. Climbing a tree is apt to break away branches and spurs. The most useful ladder is that having three legs. It will stand on almost any kind of ground and may be safely used between branches. Canvas bags should be employed to pick into and to transfer the fruit to the sorting-table for grading.

### AGRICULTURAL SHOW DATES.

Woodville A. and P. Association.—Woodville, 27th January, 1915.

Thames Valley A. and P. and H. Association.—Te Aroha, 28th and 29th January, 1915.

Helensville A. and P. Association.—Helensville, 29th January, 1915.

Dannevirke District A. and P. Association.—Dannevirke, 10th and 11th February; Ram Fair, 12th February, 1915.

Hawke's Bay A. and P. Society.—Hastings, 2nd and 3rd March, 1915.

Ashburton A. and P. Association.—Ashburton, 17th and 18th March, 1915.

Southland Metropolitan A. and P. Association.—Invercargill, 18th, 19th, 20th, and 21st May, 1915.

Waikato Winter Show Association.—Hamilton, 1st to 5th June, 1915.

Manawatu and West Coast A. and P. Association.—Palmerston North, 22nd, 23rd, 24th, and 25th June, 1915.

## SEMI-OFFICIAL TESTING.

W. M. SINGLETON.

WE have comparatively few cows closing their testing-period at midsummer, although we report below the yields of some thirty-seven cows and heifers which have been granted certificates during the months of November and December.

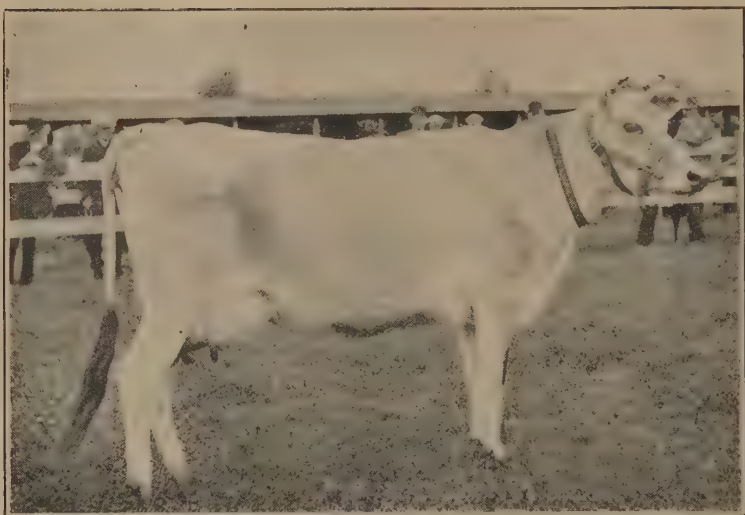
These certificates granted rearrange the order of leaders in a number of classes. In the three-year-old Ayrshire class, Lily of Glenweir, with 358.97 lb. fat, had a good run for the first place,



MR. S. R. LANCASTER'S BRIGHT STAR II, THREE-YEAR-OLD JERSEY,  
WITH A RECORD OF 542.86 LB. OF FAT.

since she produced within  $2\frac{1}{2}$  lb. fat of the leader, Kanadale Fanny. In mature Ayrshires, Kanadale Whitelets takes second place with 467.83 lb. fat. In this class Fancy IV of Cambridge still maintains her position as leader with 492.03 lb. fat.

In Jerseys, Mr. F. E. Hellyer's Lady of Collingwood is again to the fore. In her first lactation as a yearling she produced 524.29 lb. fat. She started her second lactation-period when a few days over three years of age, and has "come back again"



MR. W. J. HALL'S HAZELINE, THE FOUR-YEAR-OLD JERSEY, WITH A RECORD OF 449'09 LB. OF FAT.



MR. J. PIRIE'S NELLIE SEGIS WILD ROSE IN THE TWO-YEAR-OLD HOLSTEIN CLASS, WITH A RECORD OF 448'46 LB. OF FAT.

with the magnificent record of 603.05 lb. fat. With this record as a three-year-old she displaces the class leader; Pepper, belonging to Mr. A. E. Wilkinson. Twylsh's Solid Gold, belonging to Mr. H. E. B. Watson, with 566.64 lb. fat, also beats Pepper. In the four-year-old Jerseys Mr. F. S. McRae's Charm now leads, she having supplanted Mr. W. J. Hall's Hazeline. Charm's record of 572.52 lb. fat sets a high standard for this class.

In Holsteins we have no class leaders to report this month. In the two-year-old class Mr. J. Pirie's Nellie Segis Wild Rose has put up a nice record of 448.46 lb. fat. She commenced her test while under two years old, and as a yearling has the best Holstein record to date. Southland has not entered very many cows in test, but has won some nice records. Mr. J. Wylie's Dutch Lass of Edendale is among these with a certificate for 557.68 lb. fat in the two-year-old class. This record places her third in this class.

One of the most creditable performances which we have to report this month is that of Olga at the Weraroa Experimental Farm. Her record of 611.24 lb. fat, although it places her only fifth in her class, is worthy of special consideration, since the Manager reports that "Olga has never at any time been milked three times a day or received any special attention, but has grazed under ordinary conditions with a herd of fifty cows."



MESSRS. COCKBURN BROS.' KANADALE NETHERTON EDNA, THE TWO-YEAR-OLD AYRESHIRE, WITH A RECORD OF 313.92 LB. OF FAT.

| Name of Cow. | Name and Address of Owner. | Age at starting Test. | Fat req'd. Cent. | Yield for Season. |       |      |
|--------------|----------------------------|-----------------------|------------------|-------------------|-------|------|
|              |                            |                       |                  | Days.             | Milk. | Fat. |

|                              |                                 |         |       |     |          |        |
|------------------------------|---------------------------------|---------|-------|-----|----------|--------|
| AYRSHIRES.                   |                                 |         |       |     |          |        |
| <i>Two-year-old Class.</i>   |                                 | Y. dys. | lb.   |     | lb.      | lb.    |
| Kanadale Lily ..             | Messrs. Cockburn Bros., Mataura | 2 304   | 270·9 | 355 | 7740·50  | 330·08 |
| Kanadale Netherton Edna      | Messrs. Cockburn Bros.          | 2 50    | 245·5 | 312 | 7732·10  | 313·92 |
| Kanadale Netherton Kate II   | Messrs. Cockburn Bros.          | 2 60    | 246·5 | 285 | 6898·50  | 283·08 |
| <i>Three-year-old Class.</i> |                                 |         |       |     |          |        |
| Lily of Glenweir ..          | Messrs. Weir Bros., Pukehiki    | 3 313   | 308·3 | 363 | 8828·50  | 358·97 |
| <i>Mature Class.</i>         |                                 |         |       |     |          |        |
| Kanadale Whitelets           | Messrs. Cockburn Bros., Mataura | 10 325  | 350·0 | 363 | 10400·50 | 467·83 |

|                              |                                |        |       |     |          |        |
|------------------------------|--------------------------------|--------|-------|-----|----------|--------|
| JERSEYS.                     |                                |        |       |     |          |        |
| <i>Two-year-old Class.</i>   |                                |        |       |     |          |        |
| Eminent's Sherry ..          | F. E. Hellyer, Dunedin         | 2 20   | 242·5 | 365 | 7351·50  | 424·52 |
| Princess Lambert ..          | F. Strange, Mangaiti ..        | 2 346  | 275·1 | 363 | 6059·20  | 326·63 |
| Silver Queen VI ..           | Dr. C. P. Knight, Te Horo      | 2 319  | 272·4 | 365 | 4794·80  | 287·50 |
| Duchess of Ferngrove         | A. H. Halcombe, Ure-nui        | 2 7    | 241·2 | 300 | 4591·7   | 267·03 |
| <i>Three-year-old Class.</i> |                                |        |       |     |          |        |
| Lady of Collingwood          | F. E. Hellyer, Dunedin         | 3 34   | 280·4 | 365 | 9386·10  | 603·05 |
| Twylish's Solid Gold         | H. E. B. Watson, Tai Tapu      | 3 11   | 278·1 | 365 | 11304·40 | 566·64 |
| Spectacle .. ..              | W. Kemp, Onehunga              | 3 44   | 281·4 | 363 | 7378·50  | 364·16 |
| <i>Four-year-old Class.</i>  |                                |        |       |     |          |        |
| Charm .. ..                  | F. S. McRae, Palmers-ton North | 4 347  | 348·2 | 365 | 9980·10  | 572·52 |
| Stella's Queerf ..           | A. H. Halcombe, Ure-nui        | 4 142  | 327·7 | 316 | 5563·3   | 332·74 |
| <i>Mature Class.</i>         |                                |        |       |     |          |        |
| Virginia .. ..               | H. B. Curtis, Inglewood        | 6 210  | 350·0 | 365 | 8464·9   | 547·43 |
| Cowslip VIII ..              | E. Griffiths, New Ply-mouth    | 6 149  | 350·0 | 365 | 10217·5  | 567·32 |
| Mozelle .. ..                | C. G. C. Dermer, Wai-piko      | 10 241 | 350·0 | 365 | 9539·50  | 538·02 |
| Lady Disdain ..              | A. A. Ward, Miro ..            | 8 309  | 350·0 | 365 | 8670·20  | 536·05 |
| Sunflower X ..               | H. E. B. Watson, Tai Tapu      | 6 340  | 350·0 | 351 | 11797·40 | 505·16 |
| Eileen V .. ..               | H. H. Hunt, Rongotea           | 8 22   | 350·0 | 362 | 9347·00  | 491·11 |
| Orange Rose II ..            | E. Griffiths, New Ply-mouth    | 6 66   | 350·0 | 357 | 7879·3   | 455·97 |
| Sabeen II .. ..              | T. S. Edwardes, Tiaki-tahuna   | 9 330  | 350·0 | 365 | 9561·15  | 454·67 |
| Malaprop VI ..               | A. H. Halcombe, Ure-nui        | 8 43   | 350·0 | 312 | 5527·3   | 361·65 |

|                            |                                  |       |       |     |          |        |
|----------------------------|----------------------------------|-------|-------|-----|----------|--------|
| HOLSTEINS.                 |                                  |       |       |     |          |        |
| <i>Two-year-old Class.</i> |                                  |       |       |     |          |        |
| Dutch Lass of Eden-dale    | J. Wylie, Menzies Ferry          | 2 336 | 274·1 | 364 | 15604·20 | 557·68 |
| Nellie Segis Wild Rose     | J. Pirie, Woodlands ..           | 1 320 | 240·5 | 365 | 11061·10 | 448·46 |
| Holland Lassie ..          | Messrs. H. North and Sons, Omimi | 1 333 | 240·5 | 363 | 12408·25 | 424·47 |

| Name of Cow.                 | Name and Address of Owner.    | Age at starting Test. | Fat req'd. Cwt. | Yield for Season. |             |            |
|------------------------------|-------------------------------|-----------------------|-----------------|-------------------|-------------|------------|
|                              |                               |                       |                 | Days.             | Milk.       | Fat.       |
| HOLSTEINS.                   |                               |                       |                 |                   |             |            |
| Princess Gretchen ..         | C. C. Buckland, Mono-vale     | Y. dys. 2 272         | lb. 267·7       | 335               | lb. 8202·80 | lb. 268·43 |
| <i>Three-year-old Class.</i> |                               |                       |                 |                   |             |            |
| Olga .. ..                   | Weraroa Experimental Farm     | 3 230                 | 300·0           | 365               | 16141·50    | 611·24     |
| Marjorie Aaggie de Kol II    | J. H. Parkinson, Opo-tiki     | 3 165                 | 293·5           | 313               | 13501·70    | 472·63     |
| Dominion Fraulein ..         | C. Hopping, Feilding..        | 3 9                   | 277·9           | 365               | 10240·3     | 349·34     |
| <i>Mature Class.</i>         |                               |                       |                 |                   |             |            |
| Topsy de Kol ..              | J. Imlah, Kaupokonui          | 5 161                 | 350·0           | 331               | 14303·50    | 589·94     |
| Clover Pledge ..             | J. H. Parkinson, Opo-tiki     | 5 201                 | 350·0           | 364               | 18819·60    | 544·60     |
| Mary .. ..                   | Weraroa Experimental Farm     | Aged                  | 350·0           | 354               | 13681·25    | 528·68     |
| Lottie .. ..                 | J. Gould, Apiti ..            | 5 358                 | 350·0           | 346               | 11445·8     | 485·11     |
| Gretchen .. ..               | Weraroa Experimental Farm     | Aged                  | 350·0           | 314               | 12372·75    | 450·99     |
| Oakwood Pansy ..             | A. J. Gallichan, Tiaki-tahuna | 13-14 yrs.            | 350·0           | 338               | 11522·30    | 414·51     |
| Julia .. ..                  | Weraroa Experimental Farm     | Aged                  | 350·0           | 354               | 13395·10    | 380·47     |
| Somerset Princess ..         | W. Buick, Masterton..         | 6-7 yrs.              | 350·0           | 279               | 9769·00     | 355·83     |

The death is reported of one of the most noteworthy figures in the agricultural life of Britain, Sir Walter Gilbey, Bart., at the age of eighty-four, at his home, Elsenham Hall, Essex. It is as an authority on English breeds of horses that Sir Walter Gilbey is best known, he having published no less than twenty works, the horse being his principal subject. He was an eminently successful breeder of Shire and hackney stock. There was no more liberal patron of agricultural societies. After twenty-five years of strenuous service to British agriculture he was presented, in 1887, with his portrait, painted by Richardson—subscribed for by 1,200 admirers—the presentation being made by King Edward, then Prince of Wales.



## BRINE SOLUTION FOR MILKING-MACHINES.

W. WRIGHT.\*

IN discussing matters relating to milking-machines generally with Dr. R. S. Breed, of the Agricultural Station, Geneva, New York, during the course of the International Dairy Conference at Berne, he gave me some information about the work that has been carried out at Geneva in respect to the treatment of the rubber parts of milking-machines during the last few years. The method of treatment at the above station has been to hang up the rubber parts of the machine during the time between milkings, after washing in a 15-per-cent. solution of salt to which is added about 4 oz. of calcium chloride to each 10 gallons of brine. The chloride of lime is added to the brine about once a week. Dr. Breed states that there is a brine solution as described above at New York Experimental Station that has been in use for about four years and which is still in good condition. The practice is to occasionally draw off the sediment from the bottom of the trough, after which the quantity drawn off is replaced by fresh brine.

The results of this experiment are regarded as being satisfactory, and milk that has been flowing through machines the parts of which have been so treated has been found to contain, on an average, a bacterial count of 5,000 per c.c. A pamphlet is to be published shortly giving publicity to the results of the experiment.

## MILKING PAILS OR BUCKETS.

Some experiments have also been carried out with regard to milk-buckets, with the result that it has been proved that when milk has been milked into a pail that has been partly covered (about two-thirds of the upper surface) the bacterial count of the milk is only about half that of milk which had been milked into open pails.

\* New Zealand Dairy-produce Inspector, London.

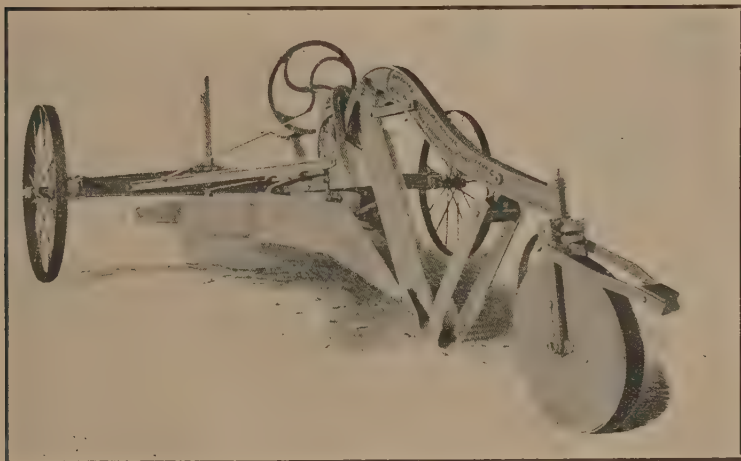
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*Potatoes on Test at Ruakura.*—Forty varieties of potatoes are being tested at the Ruakura Farm of Instruction this season. Among them are the following varieties from the State farm of Deloraine, Tasmania: Excelsior, American Bruce, White City, Harman Circular, Rector (Scotch seedling), Mac (Scotch seedling), Celt (Scotch seedling), and Pict (Scotch seedling).

## DITCHING BY MACHINERY.

### REDUCING THE COST OF FIELD DRAINAGE.

THE importance of effective drainage of agricultural land in general cannot be overestimated, a fact which is being increasingly appreciated in this country. Though the first is practically the last cost, the rather heavy expenditure entailed in carrying out the work has been the principal reason why drainage is not more commonly undertaken. It is therefore satisfactory to know that a Wairarapa farmer, Mr. Hugh Morrison, of Awatoitoi, has proved the practica-



THE DITCHING-MACHINE SUCCESSFULLY TESTED AT AWATOITOI.

bility of an American implement for cutting the necessary drains and thereby considerably reducing the cost of the work. Judging by the experience of Mr. Morrison, the machine will dig a ditch 10 in. wide by 28 in. deep at the rate of about a mile and a half a day, and at a cost of from 4d. to 6d. a chain. Of course it is not possible to cut drains by mechanical means where the soil is of a very intractable nature, but in the great majority of our soils the method should present no difficulty. The machine, which is in general use in the United States, is being introduced to New Zealand farmers by Messrs. Booth, Macdonald, and Co., of Christchurch.

## THE WHEAT-SUPPLY.

### THE NORTHERN HEMISPHERE.

ACCORDING to the *Bulletin of Agricultural and Commercial Statistics* of the International Institute of Agriculture the production of wheat is estimated at 746,566,419 quintals (a quintal equals 220.462 lb.), or 91.2 per cent. of that of 1913, for the following group of countries: Prussia, Hungary, Belgium, Denmark, Spain, Great Britain and Ireland, Italy, Luxemburg, Netherlands, Roumania, Russia in Europe, Switzerland, Canada, United States, India, Japan, Algeria (department of Constantine) and Tunis.

The *Journal of the Board of Agriculture* (London) states that the crop prospects in Siberia were generally good, and with favourable weather-conditions promise a record harvest.

The United States Department of Agriculture estimates the spring production of wheat at 217,000,000 bushels (239,819,000 bushels in 1913) and winter wheat at 675,000,000 bushels (523,561,000 bushels in 1913).

A bulletin issued by the Census and Statistical Office at Ottawa, Canada, reports that the continued drought, especially in the north-west provinces, seriously affected the yields, which are lower than those of any year since 1910 and lower than the average of the six years ended 1913. In the three provinces of Manitoba, Saskatchewan, and Alberta 728,100 acres (in addition to 753,000 acres of oats, 102,000 acres of barley) are estimated to have failed to produce any grain. In the whole of Canada the yield of wheat is estimated at 159,660,000 bushels, against 231,717,000 bushels in 1913, and 204,712,000 bushels, the average of the four years 1910 to 1913.

The acreage of wheat in Great Britain, according to the *Journal of the Board of Agriculture*, increased by 106,000 acres, or by more than 6 per cent.; this amount being very largely substituted for barley and oats, which declined by 54,000 and 45,000 acres respectively.

### THE ARGENTINE.

Reporting from Buenos Aires on the 18th September, the Argentine correspondent of the *Pastoral Review* says, "Reports from all

parts of the cereal districts continue to be most favourable. The weather has been all that could be desired, and throughout the Republic it can truly be said that the season is excellent. . . . According to the official estimate of the Minister of Agriculture the acreage in wheat is 6,473,540 hectares (1 hectare = 2.47 acres), against 6,573,540 hectares last season. . . . Generally the growing crops of wheat, linseed, and oats promise well, and with favourable weather during the next three months the yield per acre will be much greater than that of last year."

#### AUSTRALIA.

Through the courtesy of the New Zealand Government Statistician, Mr. M. Fraser, official summaries have been secured of the wheat harvest in the principal Australian States.

The Victorian yield is estimated at 4,084,865 bushels, an average of 1.46 bushels to the acre, against 32,936,245 bushels in the previous season, an average of 12.84 bushels.

The estimated production in New South Wales is 15,700,000 bushels, against 38,020,381 bushels in 1913-14, and as there is an estimated stock of 1,400,000 bushels in the hands of millers and farmers, there will be 17,100,000 bushels available for consumption and seed requirements. Under ordinary circumstances about 14½ million bushels are required for these purposes, which will leave rather more than 2½ million bushels available for export. Of the 4,137,774 acres sown in wheat, 1,174,561 acres, or 28¼ per cent., either failed entirely or were fed off, owing of course to the drought.

The South Australian estimate gives 4,664,761 bushels, an average yield of 2.19 bushels, against 16,936,988 bushels, an average of 7.47 bushels, and this was the smallest return for ten years. The yield in the 1909-10 season was 25,133,851 bushels, an average of 13.26 bushels. The present season is the driest on record. Between 700,000 and 800,000 acres sown either failed to germinate or afterwards absolutely perished.

The West Australian estimated wheat-yield is 3,272,330 bushels, an average of 2.5 bushels, against 13,331,350 bushels, an average of 12.2 bushels, last season. The area under wheat this season was 199,504 acres greater than in the 1913-14 season. The Government Statist remarks that the estimates may be increased when the annual collection of statistics is made, by reason of the rains experienced in October having considerably assisted the late-sown crops.

## NEW ZEALAND.

The Government Statistician has issued an estimate, on reports of twenty-two field Inspectors of the Department of Agriculture, Industries, and Commerce, of a total yield of 4,627,166 bushels. This is reckoning an average of 25.78 bushels an acre for the districts reported on (which comprise 174,816 acres out of the total area of 189,567 acres for the Dominion) and an average of 20 bushels an acre for districts not reported on. The estimate for the Ashburton County, which has the largest area under wheat of any county in the Dominion, is also 20 bushels. The yield of the 1913-14 season was 5,231,700 bushels, an average of 31.37 bushels. In 1912-13 the yield was 5,179,626, and in 1911-12 it was 7,261,138 bushels.

In the month of November of last year a two-year-old Shorthorn bull, Earl of Kingston, was sold at 3,000 guineas by the breeder, Earl Manners, to the Edgcote Shorthorn Company. The bull was first in his class at the Royal Show at Shrewsbury.

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There was sold by auction in London on the 13th November of last year ninety-eight horses from the Argentine. They included many good types got by Suffolk Punch and Shire horses from native mares, some of the others showing thoroughbred blood. The average price realized was £41 14s., the highest price paid being 56 guineas.

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An enormous transport of horseflesh is now proceeding from East Prussia to other parts of Germany. Thousands of German and Russian horses have been more or less rendered unfit for service by the firing on both sides, and as the cost and trouble of curing them is too great, the authorities have permitted them to be sent to replenish the meat-markets. The East Prussian horse-butchers now advertise "freshly slaughtered and officially inspected horseflesh, without bones, at 1s. 6d. for 10 lb., or 1½d. for 1 lb." In the goods-trains leaving East Prussia it often happens that several wagons are filled with these consignments of horseflesh.

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*Disease of Citrus Fruit.*—The United States Department of Agriculture is directing attention to the existing danger of introducing a dangerous disease of citrus-plants—citrus-canker—with nursery stock, buds, scions, or seeds. The disease has already been brought into America, apparently on Japanese nursery stock, and is becoming established in the Gulf citrus regions of the United States, including Florida. In this State most strenuous efforts, at great cost, which will probably be successful, are being made to stamp it out. The Department is now considering the question of establishing a quarantine on all citrus fruits, buds, scions, or seeds coming into the United States.

## CATECHISM OF PRACTICAL AGRICULTURE.

PRIMROSE McCONNELL.

IN the work of class-room instruction at Ruakura I have come to the conclusion that the students receive more benefit from, and take a greater interest in, the instruction when it is imparted in the form of question and answer written on a blackboard, the boys being required to copy the matter in their notebooks. In carrying out this system a simple catechism of agriculture is naturally evolved.

At the request of the Editor I have classified the main features of this catechism, for the benefit of farmers' sons and boys who are attending schools which have taken up the *Journal* as a handbook on agriculture.

The idea was first suggested by a similar catechism, edited by Thomas Clarke Atkeson, which catechism, however, is, in the main, unsuitable for New Zealand conditions.

It is not claimed that the answers to all queries will be beyond dispute. The fact that agricultural authorities differ on many points is no real bar to advancement, because unanimity of opinion may sometimes be suggestive of stagnation. A limited number of questions and answers will appear in each issue of the *Journal*.

### GENERAL.

1. What is your definition of the term "agriculture"?

The term "agriculture" is used to describe the improvement of the earth generally, so that the surroundings of the human race may be made more comfortable and suited to the highest degree of civilization.

2. Would you describe the work of the agriculturist as "professional"?

As agriculture embraces all economic sciences it has consequently become the highest of all professions.

3. May every one who takes up the profession of farming expect to succeed in the truest sense of the term?

No. The most successful farmers are "born," not "made," and yet a careful training may accomplish a great deal.

4. Will a large capital transform a bad farmer into a really good one?

No amount of capital will make such a transformation, although a sufficiency of capital will be an incalculable boon to the good farmer.

5. What are some of the questions which every one desirous of becoming a farmer should ask himself?

(a.) Have I real love for the work, apart from a monetary consideration?

(b.) Have I made an earnest determination to succeed?

(c.) Do I realize that farming is an occupation which has no room for dullards, but is one which will give the fullest scope for the highest intellect?

(d.) Do I realize that it is not a profession which can be learned thoroughly, and carried out successfully, with "gloved hands"?

6. Name some of the compensations that you may expect to find in the life of a farmer.

Freedom and independence, as far as this world can give them, the intense enjoyment to be had in the struggle with nature, and the building-up of a home and land that I may call my own.

7. What are some of the main essentials in successful farming?

Continuous and close observation of all animal and vegetable life on the farm; a keen but discriminating interest in all the latest findings of agricultural science, and an avoidance of hasty conclusions.

8. Is a first-class education essential to success?

No education can be too good for the farmer; on the other hand, many almost illiterate men have made a most conspicuous success of farming.

9. What is the secret of the success of such men?

The fact that they are born farmers, and have a natural shrewdness that enables them to make educative comparisons and sift the useful from the useless. They are invariably good judges of live-stock and experts at bargain-making, and they are always eager to increase their knowledge, and not ashamed to show their ignorance. It is also somewhat in their favour that they have not been spoiled by too much dogmatic teaching.

10. Is there anything in the life of a farmer which tends to degrade?

Yes; dishonesty in bargaining, and work badly done, but nothing else.

11. Will the profession of farming have a tendency to uplift and ennoble?

Yes; no other occupation more so, if performed in the right spirit, because none comes so close to nature, or is so far removed from the artificial in life.

12. Can you name something that is very detrimental to the true advancement of agriculture?

Speculation is one of the greatest hindrances to true progress in agriculture.

13. Why so?

Because it limits the efforts made in improving the land and destroys home life in the correct sense of the term. The result is an artificial patriotism which every country should do its utmost to get rid of.

14. How does agriculture compare with other professions?

Agriculture, being the basis of all other occupations, is consequently the most important.

15. Would other professions be possible in the absence of agriculture?

No industry would be possible in the absence of agriculture.

16. Do men born on the land often become famous in the history of the world?

Many of the world's greatest men have been born on the land.

17. Do the sciences of botany, chemistry, geology, entomology, physiology, &c., come under a different category from that of agriculture?

In the truest sense, Yes.

18. How so?

The agriculturist takes advantage (in a discriminate manner) of the conclusions arrived at in the investigation of these sciences, and uses them in making his calling more attractive and more profitable.

19. Do you consider it possible to have a complete knowledge of all the sciences that may be applied in agriculture, and a thorough knowledge of agriculture also?

I consider it to be impossible, because to come at any degree of perfection a lifetime's study of each science is necessary.

20. Why has agriculture made slower progress than other occupations?

Because as a profession it was for ages despised, and kept under by the ravages of war. It was also considered to be an occupation suitable for the most ignorant of the population only.

21. How has the comparatively recent advancement in agriculture come about?

It has been brought about principally by the demands of an ever-increasing population, and the necessity for the application of science in order to satisfy those demands, and hence the great progress in agricultural methods has made farming an occupation which now attracts men of the highest ability.

22. In farming, should the making of money be the main object in view?

In farming, as in all other businesses, it is in every way legitimate and commendable to make money, but not merely for the sake of hoarding it.

23. How should some of a farmer's surplus money be spent?

In improving and beautifying his surroundings, so as to make his calling in every sense more attractive.

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*Effect of Sulphur on Plant-growth.*—Sulphur is commonly used to protect vines from oidium, and it has long been noticed that, when thus used, it has a stimulating effect on the growth of the vines. The experiments of several French investigators have now made clear how this effect is brought about. Sulphur does not act directly as a plant-food, but breaks down complex nitrogenous substances in the soil to the ammonia form. Hence its action is dependent on the presence and amount of organic matter in the soil. Thus Vermorel and Dantony treated wheat and beans, grown in pots, with sulphur. When nitrogen was also supplied in the form of nitrates the addition of sulphur led to no increase in yield, but when the same quantity of nitrogen was supplied in an organic form (dried blood) an increase of 30 per cent. was noted for wheat and 60 per cent. for beans. The most recent and conclusive of experiments on this subject are those of Professor Chauzit, at Villefranche-sur-Saone, where half-acre plots of vines were treated. The effects of sulphur were markedly less in proportion to the time that had elapsed since the vines had been manured, and were increased by mixing the sulphur with the manure.—*The Scientific American*.

## WORK FOR THE COMING MONTH.

NEW ZEALAND is a country of wide variation in climatic and soil conditions. In applying suggested procedure it is, therefore, necessary for the farmer to amend it to suit local weather-conditions and the requirements of his soil—information which can best be ascertained by a study of these problems on the part of the farmer himself. Nothing can take the place of local knowledge. Little advice on an agricultural subject is capable of general application in its entirety.

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### THE FARM.

PRIMROSE McCONNELL.

At the date of writing (1st January) the drought still holds. In some districts rain has fallen in fair quantity, but, generally speaking, we are in the fifth month of dry weather, and in many localities the prospect is alarming, to say the least of it.

At Ruakura the value of deep cultivation and a supply of humus in the soil, as an aid to the conservation of moisture in dry weather, is abundantly demonstrated in paddock No. 6, which grew a cereal crop last season. It is the custom at this farm to gather up all waste straw, stack-bottoms, &c., and leave them in a heap until in a semi-rotten condition. Immediately after harvest the paddock under mention got a good dressing of this material, which was ploughed under. In July the land was again ploughed to a depth of 8 in., and thoroughly worked to a fine tilth. Part of this area was planted (late in the season) with variety potatoes, and part with chou moellier. In spite of the continued dry weather both potatoes and chou moellier look exceedingly well, and show absolutely no signs of the effects of drought—although chou moellier, being a surface-rooting plant, is not considered to be a good drought-resister. We do not yet sufficiently recognize the value of any waste material that may be ploughed under, to ultimately form a reserve of humus in the soil. In certain districts cereal straw is still considered to be of little value, but it might be put to excellent use if the stubble were left as high as possible and then ploughed under; in fact, there would be considerable saving, as the grain would require much less labour in threshing. We have, however, struck a season in which every straw (at full length) may be profitably threshed and chaffed.

Every effort should be made to sow some catch-crop as soon as the land can be ploughed. In last month's notes tares and

barley were recommended for this purpose, but the price now asked for tare-seed puts this almost out of the list. The only remedy is for each farmer to grow his own supply of seed.

A good opportunity exists for cleaning foul land on which it is not intended to sow a catch-crop. The writer is quite convinced that for the eradication of weeds we use the disc harrow too much and the cultivator too little. The cultivator serves the double purpose of stirring the soil to a good depth and dragging the weeds to the surface, where they can be effectively dealt with by the tine and chain harrows. On the other hand, the disc, although an excellent implement for pulverizing clean land, will, in moist weather particularly, have the effect of increasing rather than diminishing weeds, such as sorrel, couch, &c., as one plant will be cut into many, every one of which will commence to grow, and, being divided into comparatively small parts, they slip through the tines of the harrows and are not dragged to the surface.

Many weeds may also, to a great extent, be eradicated by the use of the digging-plough with skimmer attachment. If this implement is set so as to throw about 2 in. of the surface soil into the bottom of the furrow, very few of the original weeds will appear again, and those which grow from seed, if taken in time, may be killed with a stroke of the harrows. For thoroughly effective work the digging-plough requires a longer and deeper wing attachment than is usually sent out from the implement-works. This part should be so fixed that it will pulverize and spread the turned-up furrow so as to fill all intermediary spaces and leave a perfectly level finish. If a space is left between each furrow the turned-under weeds will certainly find their way to the surface again. On shallow land this system of cleaning is not effective, as there is not sufficient soil to thoroughly smother the skimmings; but on soil of a good depth the writer has seen even couch absolutely smothered with the digger. Early ploughing and a winter fallow are necessary to ensure the best results.

Stacks not intended for immediate threshing or chaffing should be thatched as soon as possible. A well-topped-out stack will turn the rain without thatch, but at best there is more or less waste. Where thatch is difficult to procure, a small area of rye may be grown and cut green for thatching purposes, and in many districts the rye will make a good second growth which will mature sufficiently to thresh for seed.

In dry seasons such as the present it has been noticed that all young stock are much tried by the wet weather that is sure to follow later on, and the winter mortality is usually greater than that following a normal summer. The best preventive is a little dry feed, which should be in use *before* the wet weather sets in.

Valuable mares which are rearing foals should receive a little extra feed to make up for the lack of pasture. A little chaff and bran is excellent. A foal, like all other young animals, if it receives a check through lack of feed, takes a very long time to make up lost ground.

The hoofs of all young horses should receive occasional attention and be trimmed down when necessary.

Where turnips, mangels, &c., are sown in rows sufficiently far apart the horse-hoe should be kept going. Late potatoes may receive their last spraying.

It is not too late to sow lucerne. At this station the land has been prepared for some time, but the seed will not be sown until rain comes. Every season such as this demonstrates the incalculable value of this plant, and at Ruakura it has provided a supply of green forage for dairy cows for the past three months. Lucerne has stood the test of several hundred years in certain parts of the world, and in New Zealand it has come to stay. The writer visited a farm in Hastings district a short time since, where the only visible green food was a small paddock of lucerne, which was carrying a large number of sheep per acre. The majority of the sheep on the same farm were being fed with hay.

Farmers in grain-growing districts should bear in mind when planning their crops for the coming year that all kinds of cereals should be in demand at highly remunerative rates.

Respecting the loss yearly sustained in the cultivation of wheat through the ravages of small birds, the value of a bearded variety has been clearly demonstrated at this station, the beards seeming to provide ample protection against such attacks. The Rieti wheat is one of this class. It is a good yielder and of average milling-quality. It has been tested at Ruakura, and selections are now being made with the object of its further improvement.

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## THE ORCHARD.

W. A. BOUCHER.

HARVESTING of the crop is now either in actual progress or is about to be commenced. All other work will be practically at a standstill, except that time should be spared to make the final spraying with arsenate of lead— $1\frac{1}{2}$  to 50—of late varieties of apples, in order to catch the late flight of codlin-moth.

He is a wise man who is well prepared for picking operations by having all his cases ready and in good order. It may be necessary to emphasize that it is a dangerous procedure to make

the cases too early and have these lying about the orchard or even outside the shed, as a harbour is thereby provided for codlin-moth.

The work of picking fruit is a much more important phase of the business than is generally considered. It is all very well to grow good fruit, but the advantage is largely lost if it is not placed before the consumer in the very best condition. The main object of the picker should be to handle the fruit with the greatest care, to prevent it becoming bruised. Proper picking-bags, or baskets with wood-wool at the bottom, are therefore necessary. Practically all fruit should be taken off the tree by the hand one at a time. It is always inadvisable to pick fruit in wet weather; if packed with any moisture on it fruit cannot be expected to carry well and open up on the market in an attractive condition.

Summer pears should be picked a week or two before reaching maturity, and should be allowed to ripen gradually in a warm dark room. An exception must be made to this rule in the case of some of the sweeter varieties, such as Williams's Bon Chrétien, which must be picked immediately the skin commences to colour. If stored this pear will become mealy and be thereby deprived of the lusciousness which is so much desired in this class of fruit. With the other summer varieties, which should be gathered before ripe, the mealy condition is brought about if they are picked and marketed at a ripe stage.

The earlier apples should, like the Williams's Bon Chrétien pear, be picked when the skin shows sign of changing colour.

A knowledge of the correct colour of each variety of peach is necessary, and the proper stage at which each variety is ready for marketing, if peaches are to be in the best condition when disposed of. Peaches in general should never be allowed to ripen on the tree. Especially is it necessary with peaches to pick them on a dry day, dampness bringing about decay very rapidly. If it is not desired to market peaches at once those which must be picked may be placed on shelves in a cool room. Do not place hay underneath them, as this often imparts a musty flavour to the fruit. Wood-wool will effectively protect the fruit and cause no injury.

While it is not necessary that fruit for local markets should be wrapped in paper, it should always be well graded.

Every grower has his own idea as to storing fruit, but there are certain rules which must be observed if the fruit is to be held in good condition. Generally the fruit should be stored in a cool room, though good results have been obtained by storing under a rough top shelter (formed of manuka or pine branches) in a shaded location.

It is satisfactory to know that more importance is being attached to the proper grading and packing of fruit. The success of this work largely depends on the grower himself. No hard-and-fast rules can be laid down. The grower must mainly rely on his own judgment with due consideration to the requirements of local conditions.

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## THE VINEYARD AND VINEHOUSE.

S. F. ANDERSON.

THE summer now passing into autumn has been exceptionally good for the vinegrower. Had it not been for frosts in spring, just at the flowering-time, an ideal season would have been experienced. Mildew and black-spot have scarcely been seen, while the opportunity for eradicating weeds has been exceptional. As the dry weather continues full advantage should be taken of the consequently favourable conditions for weed-killing. It will lessen the work in future years. The fact that the land is apparently clean should not, however, lessen the number of cultivations. A dry season like the present affords strong proof of the great extent to which the vine derives its nourishment from the atmosphere as compared with general farm crops, excepting perhaps potatoes.

Too much of the foliage from the fruiting-shoots of vines is still being taken off by some growers. I would remind them that this is contrary to the best practice followed by leading vinegrowers and the advice of viticultural professors of Europe and Australia. It is especially bad in a dry season like the present. It checks the natural growth of the vines, and results in small berries, having more skin and less juice, with a high tannin-content. Leave at least a dozen strong leaves above the fruit. These shoots should be pinched with the finger and thumb, not slashed off with a reap-hook, as is so commonly practised. If the distance between the wires—that is, from the second wire to the top one—is 18 in., which it should be, using the reap-hook to slash the tops is almost sure here and there to injure the rods trained along the top wire. It is most important that these be kept intact, as they form the fruiting-rods for the next season. Read the notes for February in the January issues of this *Journal* for 1913 (page 73) and 1914 (page 88).

There is little to be done in the cool vinehouse this month except to gather the fruit. If mealy bug was not checked in the earlier stages of the vine's growth it will be very troublesome to keep under now, as it will have got into the fruit. The best

remedy in such a case is to play on the affected parts with a good force of water from the garden syringe, although this method knocks the fruit about and takes away the bloom. This measure should only be adopted as a last resource. Cyaniding may be done at any time from when the berries attain their full size, or nearly so, to midwinter. Although cyaniding at this late stage kills the insect it does not get rid of it, hence the necessity for washing out the insect with a strong force of water. If the house is badly infested, cyanide with double the ordinary formula as soon as the fruit is off. It must be understood that cyaniding does not destroy the eggs, which are covered up by the female with an impervious cottony substance, the female then dying on this deposit. If the weather continues warm after the fruit is gathered and a first fumigation be given, this may be followed by a second fumigation when the eggs have hatched out, which they will do as long as the warm weather lasts. Before attempting to use this method of fumigation the grower— if not acquainted with its deadly effect on all life, including that of human beings—should read the directions given in this *Journal* for its application (on page 156, February, 1913), or he may apply to this Department for Bulletin No. 40, which sets forth very fully the conditions required for its use.

## THE POULTRY - YARD.

F. C. BROWN.

### THE PULLET.

SOME of the early-hatched pullets will now have commenced to lay—that is, if they have been done well by. It is certainly rather early for the laying season to commence, but it is a dangerous practice to retard the layer, just as it is unwise to force it. If many of the pullets come to lay in February it is well not to force their production by heavy meat-feeding. It is time enough to begin feeding a heavy forcing diet when the birds are well matured and are fit to stand the strain. An undeveloped pullet cannot be expected to lay heavily and at the same time to make any further growth. The energy necessary to reach maturity will obviously have been diverted to egg-formation. While the forcing diet for the undeveloped layer is a mistake, this is not to say that her diet should be stinted. She should be fed as well as possible, but on a plain diet, and green food should be in ample supply, while a decent range should, if possible, be supplied. It is impossible to advise as to the daily amount of food a developing bird

should receive, as the weather, the quality of the food, and the surrounding conditions must be taken into account. The only safe way of making sure that the young birds get all they require is to have food always before them. There is nothing better for this purpose than crushed oats, and if any substitute, such as mash, is provided it should be in a dry state. Of course, moist feed can be given at ordinary feeding-hours. I know the great advantage of the pullet commencing to lay in February. She will probably have a light moult and commence to lay again in June or July, when her eggs will be desirable for incubation purposes, and there is certainly nothing against having a number of February layers providing they are well matured when they commence to lay. The forcing of the pullet to lay is one of the most serious weaknesses in modern poultry-culture. Especially is this weakness pronounced when the eggs of the pullet, of the heavy breeds in particular, are used for incubation purposes. In June and July it is seldom that second-year birds of the heavier types are laying, and the poultryman is thereby forced to use pullet-eggs for incubation. The use of the pullet is not objected to when she has commenced to lay, without being forced, early in the year and has moulted at the usual time—that is, with the older birds in, say, April or May. With the heavier breeds there is a decided tendency at the present time to decreased size in the eggs produced, and undoubtedly the reason for this is the use of the first eggs of the pullets, especially when these have been forced to maturity. The subject is a difficult one, for, especially in the South Island, it is very seldom that the second-year bird will lay early enough for incubation work in July or August. I know strains of the heavier breeds which do not as pullets lay more than 20 per cent. of marketable eggs, and if the owners continue the policy of using pullets in the breeding-pens the chances are that the eggs from their progeny will exhibit a further decline in size, especially when the pullets have been mated with cockerels bred in the same way. The only remedy in such cases is to delay hatching till the eggs of the mature birds are available.

#### SIZE OF EGGS DECREASING.

Generally throughout the country there is a tendency towards smaller eggs, and one reason of this is that sufficient care has not been taken to eliminate the small egg when selecting eggs for hatching purposes. The desire for numbers instead of quality is mainly responsible for this careless policy. In mating up the breeders it is especially important to know that the cockerel has come from a hen laying a good-sized egg, for, however satisfactory the size of the eggs of the female are, the progeny will probably

fail to maintain a good egg standard if the sire is the descendant of stock the eggs of which were of an undesirable size. It has to be remembered that the male bird influences perhaps hundreds of the progeny, whereas a hen will only influence the chickens which have come from the eggs she laid. There could be no better means of correcting this undesirable tendency towards small eggs than an amendment in the regulations governing the laying competition, fixing a higher minimum requirement in the weight of eggs laid. This is even more important than deciding the winners on the value of the eggs produced, calculating the worth of these on the market prices at the time they were laid. Of course, I am not advocating the production of very large eggs there will always be a check against this in the competition for the number produced in the season. It is obvious that no undersized egg should be allowed to count in the total score when purebred stock are competing in a national prize to determine their laying-power. If nothing higher than  $1\frac{3}{4}$  oz. is to be expected, even when a bird has been laying six months or more, it is not by any means enough. A sliding scale, as in South Australia, should be instituted, so that the earlier eggs of the pullet may be allowed for, but a fair-sized egg required later on. The subject is of such importance that the Utility Poultry Club should deal with it in a drastic manner, and thereby make their competitions the force they should be for the advancement of the utility characters of our standard breeds of poultry.

#### AN INCUBATION TROUBLE.

A correspondent writes to say that he paid a long price for a setting of eggs, which were placed in an incubator heated by gas. A temperature of  $102^{\circ}$  F. was maintained, and this never varied the whole time. A Tuesday night completed the twenty-one days. The next morning the chicks were chirping in the shells. In the excitement to see them the shells were broken. The chicks did not make any further progress. The correspondent wishes to know what I think of it. Well, I think it would have been a miracle if a good hatch had been secured. Successful incubation is only possible where certain primary essentials have been observed, and if these are departed from failure is inevitable. In my correspondent's case disaster was courted. The temperature aimed at was not high enough—that is, granting the thermometer was in the correct position. The eggs, therefore, did not receive the right degree of heat, and satisfactory incubation could not be expected. The chickens, it will be observed, were chirping at a time when they should have been in the brooder. The chickens

only chirping, and no eggs having pipped, on the twentieth day should have clearly indicated a check in the incubating process. My correspondent is evidently a novice at artificial incubation, and I am afraid could not have followed the instructions supplied by the maker of the machine, or he would have known that a temperature of  $102^{\circ}$ , even when the bulb of the thermometer is resting on the top of the eggs, is not a sufficient heat to develop the embryo and ensure the hatching of complete and vigorous chickens in the natural period. To open the incubator before the chickens had commenced to emerge from the shells and breaking the shells to assist them out was again an act arising from inexperience. My correspondent suggests that I should embody in these notes definite instructions as to how chickens should be treated when hatching. This is not unlike many requests I receive for information on the details of poultry-keeping, which would never be asked were the inquirers to carefully study the bulletin on "Poultry and Eggs for Market and Export" issued by the Department, and to which these notes are merely intended to be supplementary. I have recently been called considerable distances to advise on serious troubles, and the losses of the poultry-keepers and my own time would have been saved had the bulletin in question been carefully read and the monthly instructional notes in these columns been heeded.

#### CORNS.

Many inquiries have reached me of late in regard to corns on the feet of fowls and ducks. As with the bulk of troubles affecting poultry, the only way of fighting this is to prevent it. The chief cause is continuous hard pressure on the feet. High perches and a hard floor to land on is a frequent reason for corns in fowls, and hard stony runs often bring about the trouble in ducks. This is not to say that such a floor as concrete is a mistake; this is, from a health point of view, the ideal flooring-material, but the perches should not be higher than 18 in., and there should be litter on the concrete. If a bird is valuable and is worth giving personal attention to, painting with iodine is a simple and often effective treatment, or the corns may be treated with a bluestone solution. Dissolve a piece of bluestone about the size of a walnut in half a pint of hot water, and when the solution is cold dip the affected foot into it. Repeat this treatment daily for a week or more. The bird should not be allowed to perch, and should be provided with soft bedding. Frequent dressings of vaseline or similar preparations may be afterwards applied.

## CHEAPENING THE FOOD-SUPPLY.

The great value of lucerne hay for poultry is not appreciated as it should be. Chaffed and steamed overnight it may constitute the bulk of the morning mash. With the increasing attention being given to lucerne by farmers, lucerne hay is now procurable at several centres in the Dominion. Used as above described it should prove the best of all means of reducing the present high cost of feeding. Clover-hay chaff is almost as good as lucerne-hay chaff. Ensilage may also be fed by the farmer who has a supply of a good sample of sweet silage. It can be chaffed and mixed with a little pollard or bran into a mash of a crumbly consistency. Skim-milk is an excellent food for poultry, and, where possible, should be used to moisten the morning mash. It may also be given for drinking purposes. Buttermilk may also be used to advantage. Care should be taken in feeding these by-products of milk to keep the utensils clean in which they are fed. For growing stock boiled potatoes and vegetables may be used in the morning mash. For fattening purposes, brewers' grains mixed with a little pollard and bran are very good. As a tonic and a means of giving a good colour to the yolk of the egg there is nothing better than watercress. The farmer in particular should remember that not only will a good range ensure proper development of the stock, but the birds will thereby be able to pick up a good part of their living. With the high cost of food it will pay well to protect this in every way, especially from small birds. Therefore all food should, if possible, be fed in the house, and the mash be given in troughs. If fowls are to secure the greatest benefit from any class of food it should be made as appetizing as possible. The troughs should be kept thoroughly clean, while the litter in which the grain is fed should be occasionally changed.

## THINGS TO REMEMBER.

There is no greater weakness in poultry - keeping than the holding of cockerels beyond a marketable age.

Cleanliness is the safest of all means of preventing vermin and disease.

Ample shade, especially for the growing stock, is imperative at this season of the year.

Dear wheat is compelling poultrymen to cull inferior stock, while it is inducing them to experiment with substitutes for the dear grain, which may not improbably lead to decreased cost of production without reducing the output.

## THE APIARY.

F. A. JACOBSEN.

### MANAGEMENT OF COLONIES DURING THE HONEY-FLOW.

HAVING previously explained through these pages the spring and early summer management of colonies, it but remains for me to give some details on management during the honey-flow before commenting on the gathering of the harvest. I have always told my readers that a weak colony at this time of the year is useless as a producer, and have advocated the desirability of building up colonies early in the summer as the only way to secure a payable surplus of honey.

An instance of the energy and care that must be devoted to bees in districts lacking sufficient natural spring food may be mentioned with advantage. Last year the particular beekeeper fed an average of 22 lb. of sugar to each of his colonies, which resulted in his securing a very much larger surplus than his beekeeping neighbours in the same kind of country. The extra surplus paid for the sugar more than twice over. This year he is feeding the same quantity per colony, and has now disposed of 5 tons; and he was still feeding when I visited him last, six days before Christmas. I shall publish later the amount of honey secured by this beekeeper above some of his fraternity in the same district.

Assuming, then, that a colony is well fitted in numbers for the honey-flow, and that it is time a super was added, proceed to place in the super from two to four combs of brood from the brood-chamber, replacing these with empty combs or frames fitted with foundation. This will cause the bees to start work in the super at once. By the time this is printed, however, in the majority of cases a super will already have been added. A second one is probably needed, which is put between the first one in position and the brood-chamber, or, in other words, immediately above the brood-chamber, with the first one on top. If necessary, supers may be added in this manner until the hive is five or six stories high, the new addition always being placed just above the brood.

### QUEEN-EXCLUDERS.

In reference to the use of queen-excluders I shall say little, as they are favoured according to the different methods of management by individual beekeepers. They are used for the purpose of

confining the queen to the lower chamber, while the bees can pass through to the upper stories with ease. The advantage of this is obvious when extracting-time comes, and all combs of honey are handled in place of honey and brood in the same comb. In the hands of amateurs they have several disadvantages, chief of which is the swarming trouble, but these difficulties may be overcome by experience.

#### INTRODUCING QUEEN CELLS TO COLONIES WITH A LAYING QUEEN.

There are many methods of requeening colonies, and one which dispenses with the nuclei for mating purposes may be described. It will be noted that not the slightest loss is occasioned, yet the method is little known. Supposing you have a large number of colonies to requeen the work entailed is great, and any way that successfully reduces the labour is welcomed and worthy of consideration. The equipment necessary is a queen-excluder surrounded by a wooden frame to fit flush with the four outsides of a super. In this frame two or three holes are bored to serve as an entrance for the bees from the upper story. The old queen is placed in the upper story with all the young brood, and a ripe queen-cell placed in the lower chamber. A mat is next placed between the two chambers to prevent the bees going from one to the other; hence the necessity for the holes in the excluder-rim. In about ten days' time, when the young queen is laying, the mat may be removed, but the queen-excluder must be left. There are now two laying queens in the one hive, and the bees will usually kill the old queen in the course of a few weeks. If the bees do not accomplish this, the beekeeper must do so before the end of the flow. The method also almost entirely eliminates the swarming impulse.

#### UNMATED QUEENS.

At this season of the year, when the honey-flow is in progress, beekeepers often overlook the work proceeding in the brood-chamber. Strict watch must be kept for queenless colonies and drone-layers, otherwise unmated queens. It occasionally happens that when a colony has swarmed the weather-conditions prevent the virgin queen left behind flying from the hive to be mated. In such cases, if the delay is prolonged for a fortnight or more, the virgin queen becomes a drone-layer, and cannot, if she would, lay fertilized worker-eggs. Hence the need for a careful watch being maintained in all hives. A drone-layer should be immediately destroyed, and a new queen introduced.

## THE GARDEN.

W. H. TAYLOR.

### VEGETABLE-CULTURE.

*Asparagus*.—It is important that the growths should be preserved from injury: the future of the plants depends on it. The development of the crowns is in exact proportion to the growth of the tops. I have never found it necessary to tie the tops to stakes—at least, not since I have attained years of discretion. My plan is to cut off the tip of each strong stem when it gets about 3 ft. high, or a little less. This causes stronger growth of the side branches, which, locking together, give support to each other. I find they never break off. If satisfactory growth is not being made, nitrate of soda may be given at the rate of 2 oz. per square yard.

*Seakale*.—Old clumps should not be neglected. See that they are not making too many crowns; two, or at most three, on a strong stem are ample. Break all others off. Young plants, either from seed or whips, should be kept growing. Keep the soil about them loose. Mulch if the soil is very dry. Half-decayed manure is best for the purpose. Wood-ashes, with burnt earth from a rubbish fire, is good for seakale, and a dressing of salt—2 oz. per square yard—will help them.

*Tomatoes*.—It is wise to spray occasionally with Bordeaux mixture: it may save loss from blight, and is not much trouble. Keep waste growth down as much as possible. All the large leaves should be preserved, but leaves between the ground and the fruit are of no value, therefore when a bunch of fruit has been gathered the leaf against it may be cut off.

By now most of the arrangements for the winter supply should be complete. All members of the *Brassica* family, including cabbages, broccoli, savoys, and curled and cottagers' kale, should now be in their growing-quarters. It will be useless to plant much longer, for they would not come on. The end of January is late to plant. Very moderate success may attend planting early in February, and plants put out later would fail.

*Turnip* seed may still be sown in small quantity. Mid-March is soon enough for the winter crop.

Early in February is a good time to sow *silver-beet*, a very useful crop indeed in seasons when the brassicas are only a partial success, and useful in all seasons where a large supply of vegetables has to be maintained. And here I may remark that, in the ordinary routine of a well-managed garden, I do not advise sowing

silver-beet till this time. My experience is that it is not usually wanted during a long period, for it palls on the taste if served too often. The difficult time in all vegetable-gardens is September and October. Most winter stuff is gone then, and spring stuff, except asparagus, has not come in. If silver-beet were sown as indicated, it gives good gatherings of young leaves during those months, as well as earlier; but if it were sown much earlier it becomes worn, and is therefore not so useful at the time of scarcity.

*Spinach.* This very useful vegetable has but a short life during the summer. It runs to seed very quickly, but this is of little consequence. It is easily sown, and need only be grown between rows of other crops. It behaves differently from now on. Sown during the last half of February it will stand till October. Sow a good breadth. Let the lines be at least 12 in. asunder, and thin the plants to about 9 in. Gatherings will be obtainable all winter, but the largest will be in spring. Growth is accelerated at that time, and though the leaves soon get smaller a large number are produced, until the going-to-seed process at length ends the crop. The soil should be fairly rich. I prefer to grow the round or summer variety. The leaves are larger than the winter, or prickly, and it is sufficiently hardy for our climate. It may be of interest to say that the terms "round" and "prickly" refer to the seeds, not to the leaves.

*Onions* are at this time liable to be attacked by mildew. In places where this is known to be likely it is wise to anticipate the attack by spraying with Bordeaux mixture. I advise a strength of 2-2-40. A stronger solution appears to me to do at least as much harm as the disease. It is not advisable to bend or twist the necks to induce them to bulb: they usually do this better if left alone. In general practice I have found the twisting plan useful only in the case of giant bulbs. These are sometimes treated to liquid manure, and this at times, particularly in moist autumns, causes a soft growth that requires checking. It is a common practice in England, but the climate there is quite different from that of New Zealand.

*French Beans.*—One more sowing may be made at the end of January. I have secured half a crop from beans put in at mid-February, but it is a speculative crop.

Keep the ground well cultivated between the rows of all growing crops. The effect of loosening the surface where it has become hard is quite magical.

#### SMALL FRUIT.

Because *strawberries* have about ceased bearing is no reason for neglecting them and letting the beds get overrun with weeds and

runners. Runners should be kept stopped after a sufficient number has been secured. As soon as these are well rooted they should be severed from the parent plant. As early in March as weather will permit—some rainfall is necessary—the runners should be all taken up and heeled in in close order in a plot of good soil. They will make new roots, and, the soil being comparatively loose, they will lift by and by each with a good ball, very different to what they would be if lifted from the old bed only a short time before they are planted out.

*Raspberries.*—Keep the ground broken up and all superfluous suckers cut out. When fruiting is over the old canes may be removed. This is good practice, as it gives the new canes more freedom and the necessary light and air to ripen them and develop their fruit-buds.

*Loganberries.*—Carefully preserve enough new rods to replace those now bearing. These should be preserved intact. All others may be cut out or prevented from growing. The old bearing-rods may be all cut away as soon as fruiting is over.

*Gooseberries.*—Spray with 4-4-40 Bordeaux mixture to prevent or stop the ravages of the leaf-spot disease.

#### FLOWER-CULTURE.

*Bulbs.*—At this time of year the spring-flowering bulbs are mostly dormant. They should not be forgotten. A little carelessness may cause the loss of prized bulbs. When they are hidden beneath the surface they are easily injured by working-tools. They may be dug in deeply, or the soil about them may crack and insects get in and injure them, particularly woodlice and slugs. The site of each clump should be marked with a strong label with the name distinctly written thereon. It is a good plan to cover the sites with a layer of sand several inches thick, or if it is of a suitable character, some of the surrounding soil may be drawn up. Such protection will preserve the bulbs from the several dangers, and later on when the soil or sand is removed there will be no weeds growing among the bulbs. This alone makes the little trouble it is to cover them up quite worth while. Most bulbs that have been for any reason lifted may be planted back at once, though it is not imperative to do this. They are quite safe in the ground in any case, and it is better than keeping them out too late. Some of the narcissi naturally rest but a short time. Though the tops are hidden the roots may be active, and it is only when the roots are active for some time before top growth begins that we get the best flowers. Late-planted bulbs may apparently be all right, and so they usually are in so far as

they do not die, but the trusses are likely to be small, and the stems attenuated.

*Carnations* may now be layered or raised by means of pipings. Plants raised by layering are the best because they root quicker and a larger plant can be secured, but obviously this method is available only for increasing plants in one's own garden. There is an idea that cuttings, or "pipings" as they are usually termed, will not succeed till autumn, when the soil is moist and conditions generally are in the same state. This is quite a mistake. They will root at any time if the proper measures be taken. In the spring they will root freely on a mild hot-bed, in which case they are put round the sides of pots, the soil being surfaced with sand. Usually the pipings are best in the ground. The best way is to select a spot that is not exposed to the midday sun, though it must be a light situation. Handlights are the best protection. These are in constant use in England, but are rarely seen here. French cloches are an advanced handlight—large bell-glasses, in fact. The desideratum is protection from drying winds and rain. Drying wind or sunshine would evaporate the moisture from the foliage of the cuttings and they would die from exhaustion, while too much water would rot the pipings. A small frame with a close-fitting light answers very well. The sides of the frame must be low, not more than 10 in. or 12 in. at the back. A box without bottom or top, and a sheet of glass to cover it is also useful. The soil should be light and well drained, and surfaced with sand at least 1 in. thick. When the pipings are in, water thoroughly at once through the rose of a watering-can. A careful watering is necessary afterwards. They must be kept moist, but not saturated. Later on pipings strike well enough in the open ground or in boxes without a screen of glass, but this is quite the amateur way. They are too late to make useful plants the following season. Pipings are made from healthy shoots that are not too soft. Trim off a few lower leaves and cut square across just under a joint, not through the joint. Some growers run the knife up the centre of the stem for about half an inch, splitting it in two. This gives more surface to make roots, but its value is a disputed point. The piping thus far prepared, gather the tops of the grass into a bunch and take them off with one cut. The length to cut off is such as will leave uncut the young growing leaves in the centre. Layering has been fully described in former issues. A shoot, or bunch of shoots, is cleared of its lower leaves, a cut is made on the under-side, entering just below a joint, and continuing up through the centre of the stem for about two-thirds of an inch. It is then pegged down securely. Sand should be added if the soil is not naturally very free. Failures are likely to occur if the

tongue made is too small, also if the upper part of the cut is not well in towards the centre. The tops of the leaves should *not* be cut in the way advised for pipings.

Current work will include taking advantage of the off time in seed-raising, to sow seed of such perennials and biennials as may be required, and particularly wallflowers, &c., for early spring flowering. Strike cuttings of geraniums. In places where frost prevails it will be necessary to put them in boxes; in other places a plot in the open ground will answer, and there will be less work attending to it.

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## THE HEMP INDUSTRY.

W. H. FERRIS.

WITH improving prices the business of milling is showing more activity. A number of mills which had ceased operations are now either working or their machinery is being overhauled preparatory to their being again commissioned. The renewed activity is principally taking place in the Manawatu district. Should present prices continue it is probable all well-equipped mills having a good supply of readily got-at leaf will renew operations.

A feature of the market in the earlier part of the season was the special demand for higher-quality grades, and the leaf being uniformly good the quality of the fibre produced was in consequence better than it has been for many seasons past. Now, however, there is a demand for all grades. It is to be hoped that, with the sound leaf available, millers will continue to send forward fibre of the better qualities. It should be unnecessary to emphasize that the better the quality we can export the better the chance of New Zealand phormium-fibre being utilized for purposes which will create an expanding demand for higher grades, and thereby bring about the use of our native fibre by an increasing number of manufacturers. By catering to buyers of the lower grades the use of phormium as a substitute for better rival fibres is encouraged, to the ultimate harm of the industry.

The demand for the better-quality fibre and the general freedom of leaf from disease have not been the only factors responsible for the high-grading hemp being sent forward. The season has been distinctly favourable for bleaching operations, and this has been responsible for an exceptionally good colour. Thus with careful stripping (which has been general), sound leaf, and fine bleaching-conditions the bulk of the fibre produced this season has been clean,

strong, and of an attractive colour—the three main considerations in a commercial fibre.

The improvement in this season's quality is well indicated by the following table, giving the grading of the lines forwarded during the last three months of 1914, together with the percentage of the different grades, compared with the percentages in the corresponding period of 1913:—

QUALITY OF HEMP EXPORTED.

| Month.                        | Superior. | Fine.  | Good-fair. | Fair.       |            | Common. | Rejected. | Condemned. | Total. |
|-------------------------------|-----------|--------|------------|-------------|------------|---------|-----------|------------|--------|
|                               |           |        |            | High Point. | Low Point. |         |           |            |        |
|                               | Bales.    | Bales. | Bales.     | Bales.      | Bales.     | Bales.  | Bales.    | Bales.     | Bales. |
| October ..                    | 7         | 177    | 2,712      | 2,397       | 625        | 99      | 16        | ..         | 6,033  |
| November ..                   | 7         | 324    | 2,818      | 2,019       | 402        | 95      | 14        | ..         | 5,679  |
| December ..                   | ..        | 329    | 2,708      | 2,745       | 557        | 210     | 79        | 17         | 6,645  |
| Totals ..                     | 14        | 830    | 8,238      | 7,161       | 1,584      | 404     | 109       | 17         | 18,357 |
| Percentage                    | 0·7       | 4·52   | 44·87      | 39·00       | 8·62       | 2·2     | 0·06      | 0·09       | ..     |
| Corresponding quarter of 1913 | ..        | 539    | 13,488     | 18,299      | 7,464      | 1,270   | 157       | 20         | 41,237 |
| Percentage                    | ..        | 1·3    | 32·7       | 44·35       | 18·1       | 3·07    | 0·38      | 0·05       | ..     |

QUALITY OF TOW EXPORTED.

|                                    | First Grade. | Second Grade. | Third Grade. | Condemned. | Total. |
|------------------------------------|--------------|---------------|--------------|------------|--------|
|                                    | Bales.       | Bales.        | Bales.       | Bales.     | Bales. |
| Quarter ending 31st December, 1914 | 1,522        | 2,598         | 841          | 51         | 5,012  |
| Percentage .. ..                   | 30           | 52            | 17           | 1          | ..     |
| Quarter ending 31st December, 1913 | 1,361        | 6,115         | 5,440        | 627        | 13,543 |
| Percentage .. ..                   | 10·5         | 45            | 40           | 4·5        | ..     |

Several disastrous fires in phormium swamps have occurred in the Manawatu and Wairarapa districts. In each case the leaf destroyed was of excellent quality, the fires representing a serious loss to the owners. In the Wairarapa fire, at Mr. A. Toogood's 400-acre swamp, the whole of the flax was practically destroyed.

Among a list of British officers killed in action published early in November was Captain Mervyn Crawshaw, of the 5th Dragoon Guards, a noted English horseman. He once won the gold cup at the New York Horse Show, and was one of the few British officers who usually held their own in the jumping competitions at the chief international shows.

## COMMERCIAL INTELLIGENCE.

### APPLE-EXPORT TRADE.

THE High Commissioner for New Zealand, the Hon. T. Mackenzie, reports as follows on the prospects of the apple trade, under date of London, 6th October :—

I have the honour to acknowledge the receipt of your cablegram of the 3rd instant reading as follows : " What are the prospects of fruit for coming season, particularly with regard to apples ? " To which I despatched the following reply : " 6th October, 1914.—Fruit : In answer to your telegram of the 3rd October : English fruit crop this season is unusually good. Apples are plentiful. American shipments are expected to be heavy, Continental ports being closed on account of war. Last season Australian prices opened well but closed badly, averaging 6s. to 8s. per case. Hardly possible under disturbed conditions to give reliable forecast. Prospects are decidedly uncertain.—MACKENZIE."

The season in this country for the growth of all classes of fruit has been unusually good. Apples are now on the market, but, being extremely plentiful, they realize only low and unpayable prices. The American crop—especially that from California—is also understood to be large. Shipments of American apples, the first of which will arrive next week, are expected to be heavy. The usual shipments to this country will this year, on account of the war closing Continental ports, be greatly increased. Consequently prices are expected to rule low. It is, of course, now possible to hold apples in cold store and to keep them in good sound condition for a considerable length of time. This, however, has not hitherto been done to any great extent, the shippers preferring to realize their stocks rather than risk the market after incurring storage charges, and I am informed that in those instances where apples have been held over in cold store in the expectation of securing better returns the financial results have not proved satisfactory. This year, however, with the increase of supplies diverted to this country from the Continent, it may be that a portion of the stocks will be held over, but the opinion is held by those in the fruit trade in the city that this will not be done to any great extent. Of course, if it were, it would have an adverse effect on the market for New Zealand shipments here next year.

The prospects for New Zealand fruit on the English market next season are naturally, so far ahead, difficult to forecast. Shipments cannot reach this market before May. Consequently, and especially with the disturbed conditions at present prevailing, any opinion that may be hazarded must be to a very great extent speculative and cannot be accepted as a reliable forecast. Prospects are decidedly uncertain.

### BRITISH BACON AND HAM MARKETS.

THE High Commissioner reports on British bacon and ham markets, under date of London, 10th November, 1914, as follows :—

As with most other foodstuffs, the market for bacon has been considerably disorganized on account of the present war. At the end of July, prior to the outbreak of hostilities, the market was firm, with rather an upward tendency, and average normal prices ruling—Irish bacon being quoted at 75-79s., Danish 73-77s., Dutch 63-69s., Swedish 67-77s., and Canadian 66-70s. per cwt. During the week ending the 1st August, owing to rumours of war, prices firmed up somewhat, the market had a strong tone, and quotations were from 5s. to 7s. per cwt. above those of the previous week. The following week, in which war was declared, there was a great rush to buy, and this, combined with the uncertainty as to whether Continental supplies would continue or not, forced the prices up to a prohibitive level ; Irish, Danish, and Dutch bacon were all quoted at from 98s. to 100s. for the best qualities, and Canadian at 95s. Later, however, a reaction set in, as at these prices trade was reduced to a minimum, and although there was a temporary

scarcity on account of delay and difficulty in delivery through disorganization, the small demand had the effect of gradually reducing prices to a more reasonable level. By the end of August the prices had fallen by as much as 10s. per cwt., Irish being then quoted at 88-90s., Danish 84-87s., Dutch 74-84s., and other countries in proportion.

From the middle of September onwards the Danish and Irish killings have been exceptionally heavy, this in the former case being partially due to the dearth of feeding-stuffs in Denmark, in which country the killings have been from 46,000 to 56,000 carcasses per week. The result of this has been that even with the lowered prices supplies have been in excess of the demand, and prices have fallen still further. It is anticipated, however, that the Danish killings will soon fall off, and that prices will again rise somewhat: to-day's report indicates that, although prices are not quotably higher than at the time of my cabling you, the market shows a somewhat firmer tendency. The following are the latest available quotations: Irish 70-74s., Danish 66-69s., Dutch 62-66s., Swedish 63-66s., and Canadian 64-66s. per cwt.

The movements of the ham-market have been more or less in sympathy with those of the bacon-market, but the trade throughout has been abnormally slow, mainly on account of the desire of the general public to purchase the cheapest foodstuffs.

At the end of July there was only a moderate demand, but prices were steady, English being quoted at 96-114s., Irish 100-116s., and Canadian and American 75-80. per cwt. When war broke out the price of English hams suddenly jumped to 120-124s., but as the demand fell off prices gradually declined, until they are quoted to-day at 98-112s. At the end of August Irish hams were as high as 108-118s.; this price again has fallen to 88-108s. Canadian and American hams were not quotable during the first few weeks of the war: by the middle of September, however, there was a number on the market, and were quoted at 84-88s. for Canadian and 80-82s. for American, whereas the respective prices to-day are 72-76s. and 68-70s. per cwt.

## CANADIAN IMPORT REQUIREMENTS.

THE New Zealand Trade Commissioner, San Francisco, Mr. E. Clifton, reports that much annoyance and loss has been caused on West Canadian markets by New Zealand shippers failing to complete the special invoice forms required by the Canadian Customs authorities. Apparently the approved form of invoice is filled up, but failure has been made to supply the information desired in Certificate Form M, which is printed on the back of the specimen form of invoice. This certificate reads as follows:—

### CERTIFICATE FORM M.

I, THE undersigned, do hereby certify as follows:—

(1.) That I am the exporter of the goods in the within invoice mentioned or described;

(2.) That the said invoice is in all respects correct and true;

(3.) That the said invoice contains a true and full statement showing the price actually paid or to be paid for the said goods, the actual quantity thereof, and all charges thereon;

(4.) That the said invoice also exhibits the fair market value of the said goods at the time and place of their direct exportation to Canada and as when sold at the same time and place in like quantity and condition for home consumption, in the principal markets of the country whence exported directly to Canada, without any discount or deduction for cash, or on account of any drawback or bounty, or on account of any royalty actually payable thereon or payable thereon when sold for home consumption but not payable when exported, or on account of the exportation thereof or for any special consideration whatever;

(5.) That no different invoice of the goods mentioned in said invoice has been or will be furnished to any one; and

(6.) That no arrangement or understanding affecting the purchase price of the said goods has been or will be made or entered into between the said exporter and purchaser or by any one on behalf of either of them, either by way of discount, rebate, salary, compensation, or in any manner whatsoever other than as shown in the said invoice.

[Signature].

Dated at , this day of , 19 .

## ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the Journal in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble and to ensure the best advice. In stating a question the most complete descriptive details should be furnished.

Correspondents desiring information in regard to manurial treatment of soil are requested to fill in and forward the prescribed form—"Application for Advice as to Manurial Treatment of Soil"—obtainable from any office of the Department in the Dominion.

In every instance a question to which an answer is desired in these columns must be accompanied by the full name of the inquirer, not necessarily for publication, but as a guarantee of good faith. The question should be written only on one side of the paper.

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### MAGGOT-FLY.

"PUZZLED," King-country :—

Herewith in bottle of spirits a maggot which was taken from the inside of the head of a freshly killed sheep. It appeared to be in the brain, and was discovered by my splitting the head open to get the brains. The sheep (dry six-tooth ewe) was in good order and quite healthy, and the head was immediately split open after the sheep was killed. Could you tell me what it is?

The Live-stock and Meat Division :—

The specimen proves to be the larval form of the maggot-fly, *Cestrus ovis*. This is a comparatively harmless fly which deposits its eggs on the body of the sheep or around its nostrils. The larvæ enter the nasal passages and penetrate upwards, often as far as the perforated bony plate dividing the upper air-passages from the brain. Their presence in the nasal cavities brings on a fit of violent sneezing, and by this means they are dislodged and fall to the ground. Here the larvæ undergo a further change to the mature fly. The larvæ found in the nasal chambers represent only one phase in the life-cycle of the fly, just as the bot-fly of horses undergoes a certain portion of its development within the stomach of the horse. Unless present in immense numbers, the larvæ do not exercise any injurious effects upon their temporary hosts.

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### PINUS MURICATA.

"SUBURB" :—

Last June I planted about a hundred *Pinus muricata* on a section which is exposed to both northerly and southerly winds. For one month after planting they were quite healthy, but now, with the exception of a few, the young trees have turned completely brown. Is it of any use keeping them in the ground in the hope of their reviving, or can I do anything to save them?

The Orchards, Gardens, and Apiaries Division :—

The trees will probably go back a little for some time after planting. It would be advisable to shelter them until well established. The soil should be kept loose round them during the first year or two, and water applied if the ground becomes very dry. *Pinus muricata* is hardy, and one of the best trees for shelter.

## FODDER CROPS.

"NEW CHUM," Matakoho :—

I have two paddocks down in oats at present ready to cut. What would be the best crop to sow for winter feed? I was thinking of sowing vetches. Will I have to sow more oats with them, or will there be enough self-sown from the present crop? What quantity of seed will it require to sow broadcast about 2½ acres? When will be the best time to sow? The ground has been well worked before the oats were put in. Will discing the seed in be enough, or will I have to plough again? Soil is a light clay, and breaks up very easily.

The Fields and Experimental Farms Division :—

Barley or rye would be a suitable crop. 2 to 2½ bushels of seed per acre would be sufficient. An additional few ounces each per acre of rape and soft turnips might be of value. Vetches should be sown at the rate of 1 bushel per acre, together with 1½ to 2 bushels of oats. The self-sown oats would probably not be in sufficient quantity to be of value. Good heavy discing might provide sufficient cultivation, but the land would probably be more benefited by ploughing.

## YARROW AND LOTUS MAJOR SEED.

C. G. H., Te Teko, Rotorua :—

I would be much obliged if you would give the names of the enclosed plants, and also state whether it would be profitable to gather the seed of Nos. 1 and 2 by hand, and, if so, how it should be done, and what it would sell for per pound to seedsmen.

The Biologist :—

Specimen No. 1 is yarrow (*Achillea millefolium*); No. 2 is greater birdsfoot-trefoil (*Lotus major*).

Yarrow is used sparingly in certain mixtures for permanent pasture on poor land, and is also sometimes included in lawn mixtures. For my part I do not consider that yarrow is of much value in pastures, and do not advise its use. However, it has become customary to include it in certain districts of New Zealand under the supposition that it is a valuable sheep-feed. 2 oz. per acre is the average quantity that is included in permanent pastures. The seed is always dear, varying from 3s. to 7s. per pound, and the price paid by merchants naturally varies considerably. A considerable amount of the seed used in New Zealand is locally grown, being produced mainly in the Canterbury District. The local demand being small, the cultivation of this seed is seldom undertaken, but there seems no reason why a considerable export trade could not be developed on a profitable basis. The crop is generally hand-harvested soon after the ray-florets wither, and the cuttings can be left on the ground to dry. The seed can be easily flailed out, and should then be put through a winnow.

*Lotus major* is a valuable clover, and the local consumption probably exceeds 10 tons per year. The price paid by merchants is generally 1s. 6d. per pound, but this year, owing to the shortage of the crop and the normal German supplies being unavailable, it is considerably higher. To harvest this seed by hand the paddocks should be shut up at the end of September, and a normal crop is generally ready to cut about the end of January. No set time, however, can be given, as the forwardness or otherwise of the crop is determined by local conditions. The crop ripens fairly regularly, and should be cut when the first-formed pods are just commencing to open. The cuttings, in those parts where the crop is very ripe, are stacked almost immediately, but a day or two, in which the cuttings are turned once or twice, is given for the less ripe portions of the field. Sheeting or sacks should be placed underneath the stack to catch any seed that might fall. When carrying out the operation on a small scale it is advisable to spread out the stack on sheeting during the daytime and restack at night. When the cuttings have become thoroughly dry the seed is beaten out with an ordinary flail. Several threshings are generally necessary in order to be sure of all the seed. It is advisable to allow the cuttings to lie in the sun for a few hours before threshing, as when taken direct from the stack the seed-pods are not crisp, and hence are more difficult to break open. With an ordinary sieve having about 1 mm. gauze, and in a fairly steady wind, the seed can be cleaned to a respectable degree of cleanliness.

## FODDER CROPS FOR COWS.

## "COW-FEED," Tuakau :—

1. What are suitable successive crops to carry eighteen cows through the winter (1915)? The land is first class, 7 acres having been in fallow for three months.
2. What is a suitable rotation of crops to carry twenty cows right through the year? When should the crops be put in, and what acreage of each should be sown?
3. What amount of liquid will it take to spray 1 acre of potatoes?

## The Fields and Experimental Farms Division :—

1. Only under most favourable climatic conditions would it be possible to grow a succession of crops during the winter months. It is now too late for the sowing of root crops, mangels, or swede turnips. The following green crop would give, under favourable conditions, a succession of cuttings or feedings-off during the winter months: 1 bushel Russian barley, 1 bushel Black Scotch tares, 1½ bushels Italian rye, per acre. These varieties are strong, vigorous growers, and would produce a large amount of feed that dairy stock are particularly fond of. If the feeding-off system is adopted, temporary dividing-fences should be erected, so that one part would be recovering while the other was being fed off. The best results would be obtained from cutting and feeding in cow-bails or from hay-racks.

2. A rotation of crops for eight months starting from end of January: 2 acres maize—first sowing early in November of 1 acre, balance two sowings at intervals of two weeks; 2 acres mangels, sowing in October, 6 acres reserved for hay to be fed with mangels; 4 acres with a mixture of Russian barley, tares, and Italian rye, to be fed after mangels up to October. From October to January there should be sufficient grass to carry on.

3. The quantity of spray would depend on at what stage of growth spraying is carried out, size of haulms, and amount of foliage. With a full-grown crop about 100 gallons would be required. The mixture necessary for 1 acre would be 100 gallons water, 20 lb. sulphate of copper, and 23 lb. washing-soda.

## TREES SUITABLE FOR PLANTATION.

## H. SPOONER, "Ngawaka," Martinborough :—

I have about 4 acres of unfenced idle land which I propose turning into a plantation for fencing and firewood. The soil is papa-clay, lies fairly dry, steep—too steep to plough—and faces the west. About half this block is clear of scrub, the other half is rather thickly covered with large and small manuka. I would be glad to have your advice what to put in, and how. My idea is to fell and burn the manuka and to sow black-wattle seed while it smoulders, but on the grassy portion to dig holes about 5 ft. apart in which to sow the seed.

## The Orchards, Gardens, and Apiaries Division :—

Your proposal to plant black-wattle seed is a good one, but I hardly think it would be advisable to sow just after the burn, as unless you have had previous experience with regard to the handling of the seed there would be a certain amount of risk of failure. I would suggest soaking the seed in the usual way, and sowing the soaked seed. On the grassy portion I should suggest about 2½ ft. apart as a satisfactory distance for the holes.

## THE GIANT PRUNE.

## "INQUIRER," Auckland :—

Please tell me whether the Giant prune is self-fertile or not. If not, what is a suitable variety for cross-fertilizing it?

## The Orchards, Gardens, and Apiaries Division :—

The Giant prune is generally regarded as self-fertile.

## MILDEW ON ROSES.—SORREL.

"HIWIKOA," Utiku :—

1. What is the cause of mildew on roses? Can it be effectively cured? Climbers have suffered the most. I have cut these right down, but they were soon affected again. I have also sprinkled flowers of sulphur over them when the leaves were damp, but with no result. At present all the roses in the gardens are blighted. The plants were put in recently in virgin soil.

2. I have noticed a few small patches of sorrel in the garden, and would like to eradicate it before it gets a firm hold. Can I do this successfully?

The Orchards, Gardens, and Apiaries Division :—

Mildew in roses is due to the plants being attacked by a minute parasitic fungus. Roses should be sprayed during the winter with the Bordeaux mixture, 10-10-40 strength. This will also have the effect of controlling leaf-spot, which attacks both leaf and stem.

Constant working of and removing from the soil all portions of plants that can be detected is the most effective method of finally getting rid of sorrel.

## DISEASE OF CHERRY.

"MATAREKA," Ataahua :—

Every year a cherry-tree in our garden has a splendid show of fruit, but when formed nearly all the cherries drop off. I am enclosing a few, and hope you will tell me the cause. The tree is eight years old, and the same thing has happened every year. Last year about thirty ripened and were delicious, also very large.

The Orchards, Gardens, and Apiaries Division :—

With regard to your cherries falling off before maturing, the reason probably is that the leaves of the trees have been attacked by leaf-scorch, a fungus which should be controlled by spraying with the Bordeaux mixture in the early spring, just as the buds begin to swell.

## IDENTIFICATION OF DISEASE OF OAK.

JOHN RICH, Havelock North :—

What is the scale on the enclosed twig of an oak-tree? I am told it is San Jose scale, but I very much doubt this. How should I deal with it? At present the tree looks healthy enough as regards its foliage.

The Orchards, Gardens, and Apiaries Division :—

The scale on twig is "oak-scale." As the trees affected are no doubt large, spraying is out of the question. An endeavour will be made to forward you a colony of Steel-blue ladybirds, which are the natural enemy of this scale.

## HONEY.—LIME-SULPHUR SPRAY.

"NOVICE," Rosevale, Alexandra :—

I have some honey which seems to have gone too thin. Could you tell me how I could make it thick? It is clear and a little thicker than water. What caused it to go thin?

At what strength should I use Giraffe brand lime-sulphur for first spray for young tomato-plants?

The Orchards, Gardens, and Apiaries Division :—

You do not say whether your honey is this or last season's. In any case you have possibly left it open to the atmosphere, which has lately been moisture-laden. The honey has absorbed some of this moisture, which has caused it to go thin.

Well-ripened honey should contain not more than 16 or 17 parts per centum of water, and the more water it contains the more likely it will be to ferment. Always keep in a dry, warm atmosphere, and if this cannot be procured, see that the tins or jars are closed securely. You could make it thicker by bringing the honey nearly to the boil, and so evaporating some of the moisture. Care must be taken not to burn the honey or the flavour will be injured.

So far the Giraffe brand of lime-sulphur spray has not come under the notice of this Division. We strongly recommend spraying tomato-plants with Bordeaux mixture, 3-4-50 strength, when the plants are young and tender, and with the 4-5-50 strength when the plants are more mature.

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#### BLIGHT ON PEACH-TREE.

C. R. JOHNSTON, Nixon Street, Wanganui:—

Will you kindly inform me as to the nature of blight on leaves from peach-tree enclosed, and how to cope with same.

The Orchards, Gardens, and Apiaries Division:—

The specimens are affected with silver-blight. This is a somewhat difficult disease to control once it is firmly established. In some instances spraying with a thick limewash has been effective; in others the application in early spring, as a soil-dressing, over the roots of affected trees of 4 lb. to 6 lb. of sulphate of iron or sulphate of ammonia has proved satisfactory.

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#### RHUBARB-GROWING.

"YOUNG FARMER," Upper Moutere:—

Kindly give me a few hints on the growing of rhubarb. Mine is the giant variety. It grows in fairly good, well-manured soil, but it never seems to yield much, and is continually going to seed. Do you think nitrate of soda, 4 oz. dissolved in water, would do it good?

The Orchards, Gardens, and Apiaries Division:—

Well-manured soil is required to grow rhubarb successfully. The clumps deteriorate if left for a number of years. They should be lifted every third year and divided. Two or three good crowns are enough for each set, and the large roots with which they are furnished need not be retained. The clumps may be dug up in the winter and stacked in any convenient place. Neither rain nor a few degrees of frost will hurt them. The time to replant is when the crowns show signs of renewed activity. Dividing should be delayed until then. Well-rotted stable manure is best for rhubarb.

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#### LICK FOR CATTLE.—LICE IN PIGS.

"SUBSCRIBER," Tauranga:—

1. We appear to be on the edge of the bush-sick country here, and I wish to know what is a good lick for stock to counteract it. The cattle have rock salt, of which they are very fond, but seem to want something else. Would iron in some form be desirable?

2. What is the best cure for lice on pigs?

The Live-stock and Meat Division:—

1. A good deal of experimental work has been done by the Department in the direction of endeavouring to find a method of medicinal treatment which can be conveniently applied in the form of a lick and which will be satisfactory as a preventive of bush sickness. Analyses have also been made of patent medicines for the purpose which are on the market. The best lick yet found is one composed of sulphate of iron and salt with only sufficient lime added to enable the

mixture to be firmly compressed into the shape of a brick. Soil-treatment is the most satisfactory of all, and the best top-dressing to use under the present disturbed trade conditions is 4 cwt. of superphosphate applied in the spring.

2. Wash the pigs with sour buttermilk; afterwards dress with a little ordinary sulphur ointment, especially at the root of the ears, between the fore and hind legs, and along the belly. Clean out and disinfect your sties, and keep them and your pigs in a clean condition.

#### GESTATION OF COWS.

“DAIRYMAN,” Waiongona, near Inglewood:—

Could your Department give any reason for cows going from four and in two cases to five and six weeks beyond 285 days from date of service to date of calving? In my herd of forty cows 90 per cent. have carried their calves from 307 to 315 days. They are in good condition and are doing well, and there has been no possible mistake in cows returning to bull after first service, as the bull was kept tethered and never allowed to run with them. The bull used was P.B. Jersey, two years old, and on his first season.

The Live-stock and Meat Division:—

No, we are afraid we cannot. If it is the case, as you state, that no mistake has been made in booking the dates, it is a most unusual occurrence. The ordinary duration of gestation in the cow is from 280 to 285 days. In 1,062 observations the mean period was 283 days. It is generally thought that male calves are carried longer than females. It would be interesting to learn the result in your case. A leading Continental authority gives the shortest period as 240 days, the longest 330 days, and the average 285 days.

#### POTATO-GROWING.

“SEED POTATO,” Box 3, Rototuna, Waikato:—

Would you kindly give me the reason for the following: About a month ago we planted some sound seed potatoes (Irish Queen), of which about 3 per cent. came up; the remainder formed potatoes without any stalks around the seed, which is still sound?

The Orchards, Gardens, and Apiaries Division:—

It is considered that if the potatoes were planted only about a month ago, and in view of the long, dry season experienced, the ground was probably already too dry to induce the ordinary growth.

#### “BLOWN” COWS.—TUTU POISONING.

“INQUIRER,” Clyde:—

Would you kindly inform me what treatment to give a cow when she gets “blown” through having too much young grass?

Also, what are the symptoms of tutu poisoning, and the remedy for same?

The Live-stock and Meat Division:—

It is often a very difficult matter to apply medicinal treatment to animals suffering from tutu poisoning, seeing that the trouble causes more or less severe brain symptoms, which render the animal intractable and difficult to handle. Very useful treatment for this trouble, when it can be applied, is the internal administration of liquid ammonia, or carbonate of ammonia mixed with milk or thin gruel if possible; in addition a large dose of linseed-oil, not less than 2 pints, should be given. The dose of liquid ammonia in cases such as this should be 1 oz. in a quart of milk or thin gruel. If neither of these be available it should be mixed with the 2 pints of linseed-oil which is recommended above. Liquid ammonia is irritating to the membrane of the mouth and throat, hence the necessity for

diluting it with a quantity of some demulcent fluid. It should be borne in mind that there are two liquid preparations of ammonia—one a very strong preparation, known as liquid ammonia fort.; the other the ordinary liquid ammonia, which is here recommended. If carbonate of ammonia be used in cases of tutu poisoning the dose is  $1\frac{1}{2}$  oz.

If the rumen (first stomach) is greatly distended with gas, relief can be afforded by puncturing it at a spot midway between the haunch-bone and the last rib. This should be done on the left side of the animal. Really the best instrument for so puncturing is that known as a trocar, fitted into a canula. This is a round, sharp-pointed instrument with a metal tube (the canula) fitting tightly over it. After making the puncture the instrument is withdrawn and the tube left in, thus allowing the continued escape of gas. It is unlikely however, that the farmer will have this instrument at hand, and in an emergency a sharp-pointed knife, with a long but thin blade, can be used. In this case, however, it must not be simply plunged in and withdrawn, but must be held in position after making the puncture, the blade being twisted slightly sideways, thus maintaining an opening through which the gas can escape from the rumen. Owing to the usually excited condition of affected animals, however, it is often very difficult to do this. It is usually travelling stock which become the victims of tutu poisoning, and feeding on the plant undoubtedly causes much more trouble when taken on a more or less empty stomach.

The poison contained in the tutu-plant is an alkaloid known as tutin, this being the active principle of the plant. Full particulars concerning this aspect of the question can be obtained from the Annual Report for the year 1908, in which a description of tutin is given by Mr. Aston, Agricultural Chemist.

The treatment advocated would also be suitable for acute tympanitis caused by gorging clover, &c.

#### BLIGHT ON STRAWBERRIES.

“STRAWBERRY,” Canterbury:—

A bed of strawberries has become badly affected by some pest which seems to consist of white lice. The fruit is formed and is destroyed. I am enclosing a specimen. Please tell me what it is, and whether it is possible to spray as late as now? What spray should I use, and what precautions must I take in future to prevent recurrence?

The Orchards, Gardens, and Apiaries Division:—

The lime-sulphur spray, which can be procured ready made from seed and other merchants. It is also fairly effective in controlling leaf-spot. At this season of the year it should be used with care and moderation. To prevent a recurrence, spray in winter and early spring with the lime-sulphur.

#### PEAR-CULTIVATION.

J. H. REID, Toatoa, Opotiki:—

I have a Jargonelle pear that has been bearing for the last four years. The fruit grows about half as big again as a walnut, and then cracks in all directions. It does not grow any more, but remains hard and woody. I have sprayed in the winter with Bordeaux mixture, and last winter with red-oil emulsion also. The tree is growing on the bank of a creek but well above water-level. Other pear-trees in the same line bear well.

The Orchards, Gardens, and Apiaries Division:—

It is more than probable that the reason why your Jargonelle pear does not bring its fruit to maturity is owing to attack by black-spot. All pear-trees should be sprayed with the Bordeaux mixture, 10-10-40 strength, just at the time when the buds are swelling, and again with the 4-5-50 strength once or twice after the fruit has set at intervals of about three weeks.

## RED-BIRCH.—MANURES.

A. T., Sentry Hill :—

1. Can you give me any information as to the durability of Taihape red-birch for fencing-posts?

2. The September issue of the *Journal* (page 178) states that quicklime is used to make basic superphosphate. As I have been informed by an officer of the Department that slaked lime was used, will you state which is correct and whether it makes any difference?

3. Is the result of mixing slag and super the same as mixing lime and super?

## The Fields and Experimental Farms Division :—

1. The red-birch is largely used for fencing, particularly in the Rangiwahia and Kawhatau districts. Although it is somewhat heavy, it has a long life. Several experienced farmers state that the timber will last twelve or fourteen years.

2. Slaked lime is the correct material to use. Slaked lime is made from quicklime.

3. No. The two mixtures are altogether different in character.

## SULPHUR FOR TOMATOES.

D. L. C., Mosgiel :—

I would be obliged if you would tell me how much sulphur to use on a border 100 ft. by 4 ft. for tomatoes under glass.

## The Orchards, Gardens, and Apiaries Division :—

The application of sulphur to the soil has been principally employed to control fungoid growth, such as the root-fungus of apples, and in conjunction with lime, in tomato-houses, for the prevention of sleepy-disease (*Fusarium lycopersici*), for potato-disease (*Phytophthora infestans*), or any other fungoid disease where their propagation takes place through the medium of the soil. It is a commendable practice in any case to give the soil of the tomato-house a good dusting of sulphur with or without lime. An improvement in the growth of the plants may have been credited to a manurial effect, whereas it may have been due to a check on the disease-producing effects by the sulphur. To a border of 100 ft. by 4 ft. 6 lb. of sulphur would be a good dressing—that is, a little over 2 oz. to the square yard.

## BEEKEEPERS AND THE BELGIAN FUND.

THE annual field-day of the Geraldine Beekeepers' Association took place at Mr. Simpson's apiary. In connection with this there was something worthy of record. In his opening remarks Mr. Simpson observed that we owed Belgium a great deal for what she had done, and as beekeepers they might show their appreciation in assisting the Belgium Fund. He offered 200 2 lb. tins of honey to set the ball rolling. Before many minutes had expired upwards of half a ton of honey was promised by various members present. Many beekeepers are not overburdened with a long purse, still all are desirous of helping to sweeten the sorrows of those who have lost everything. We cannot all give gold, but may help in a humble way in giving kind. This young progressive association is to be complimented in setting the lead which it is expected will be followed by other associations.—*L. Bowman*, Apiary Instructor.

## THE DOMINION'S EXPORTS TO BRITAIN.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF CURRENT AND PRECEDING SEASONS.

| Month.             | Mutton,<br>Carcasses. | Lamb,<br>Carcasses. | Beef,<br>Quarters. | Pork,<br>Carcasses. | Butter,<br>Boxes. | Cheese,<br>Crates. | Wool,<br>Bales. | Wheat,<br>Sacks. | Oats,<br>Sacks. | Rabbits,<br>Crates. | Hemp,<br>No. ls. | Tow,<br>Bales. | Kauri-<br>gum,<br>Cases. |
|--------------------|-----------------------|---------------------|--------------------|---------------------|-------------------|--------------------|-----------------|------------------|-----------------|---------------------|------------------|----------------|--------------------------|
| January,<br>1914   | 231,766               | 464,185             | 30,424             | 33                  | 150,492           | 136,086            | 108,742         | ..               | 500             | 2,851               | 15,234           | 4,306          | 11,133                   |
| "<br>1913          | 166,714               | 229,179             | 6,886              | 611                 | 109,251           | 63,864             | 118,986         | ..               | 329             | ..                  | 6,969            | 2,215          | 4,110                    |
| February,<br>1914  | 354,190               | 334,207             | 14,100             | 3                   | 86,570            | 59,532             | 127,372         | ..               | 4               | ..                  | 3,709            | 633            | 7,607                    |
| "<br>1913          | 326,337               | 403,698             | 12,666             | 64                  | 89,098            | 81,733             | 127,968         | ..               | ..              | ..                  | 12,520           | 4,295          | 7,973                    |
| March,<br>1914     | 446,522               | 551,313             | 36,689             | ..                  | 61,060            | 62,732             | 95,175          | ..               | ..              | ..                  | 8,187            | 2,562          | 3,958                    |
| "<br>1913          | 86,224                | 210,166             | 7,428              | 250                 | 47,560            | 59,844             | 49,661          | ..               | 115             | ..                  | 12,552           | 7,662          | 4,043                    |
| April,<br>1914     | 234,765               | 366,786             | 22,185             | ..                  | 7,822             | 63,796             | 58,488          | ..               | 2,901           | ..                  | 1,247            | 888            | 5,909                    |
| "<br>1913          | 303,937               | 647,948             | 16,834             | 457                 | 11,358            | 52,934             | 61,988          | ..               | 300             | ..                  | 9,049            | 3,351          | 3,889                    |
| May,<br>1914       | 336,632               | 638,397             | 39,315             | 54                  | 837               | 37,776             | 43,364          | 3,623            | 11,062          | ..                  | 8,355            | 2,112          | 9,316                    |
| "<br>1913          | 418,221               | 731,520             | 22,073             | 100                 | 637               | 46,304             | 33,281          | ..               | 265             | 2,000               | 15,751           | 5,005          | 9,057                    |
| June,<br>1914      | 261,877               | 634,981             | 36,400             | ..                  | 1,153             | 19,247             | 18,774          | ..               | 28,141          | 1,000               | 7,924            | 4,258          | 7,881                    |
| "<br>1913          | 315,034               | 528,815             | 24,444             | 588                 | 79                | 3,166              | 18,741          | ..               | ..              | 13,072              | 13,592           | 4,065          | 5,439                    |
| July,<br>1914      | 225,411               | 239,143             | 38,170             | ..                  | 1,355             | 2,003              | 15,868          | ..               | 1,425           | 1,000               | 5,810            | 2,584          | 8,053                    |
| "<br>1913          | 215,713               | 331,353             | 14,030             | ..                  | ..                | 1,687              | 17,169          | 5,651            | 300             | 9,190               | 9,682            | 1,720          | 10,793                   |
| August,<br>1914    | 84,251                | 63,111              | 19,094             | 516                 | 1,979             | 50                 | 4,845           | 600              | 38,220          | 10,403              | 367              | 245            | 3,705                    |
| "<br>1913          | 161,593               | 178,263             | 13,129             | 6                   | 8                 | 407                | 8,494           | 11,604           | 45              | 38,480              | 3,714            | 2,379          | 6,406                    |
| September,<br>1914 | 53,386                | 49,200              | 2,353              | ..                  | 15,885            | ..                 | 3,337           | ..               | 5,896           | 7,288               | 1,143            | 57             | ..                       |
| "<br>1913          | 133,122               | 83,521              | 5,334              | 16                  | 6,575             | 2,020              | 7,176           | ..               | ..              | 16,336              | 3,826            | 1,501          | 10,049                   |
| October,<br>1914   | 291,432               | 128,016             | 49,104             | ..                  | 81,842            | 30,487             | 8,938           | ..               | 68,660          | 38,121              | 2,042            | 1,650          | 1,683                    |
| "<br>1913          | 14,122                | 25,735              | 580                | ..                  | 42,847            | 21,452             | 2,705           | ..               | ..              | 10,020              | 6,986            | 3,672          | 2,923                    |
| November,<br>1914  | 136,346               | 27,577              | 48,302             | 27                  | 98,729            | 70,048             | 37,604          | 15               | 24,289          | 35,783              | 885              | 110            | 1,377                    |
| "<br>1913          | 20                    | 1,479               | ..                 | ..                  | 53,468            | 23,722             | 1,891           | ..               | ..              | 2,478               | 4,162            | 771            | 2,314                    |
| December,<br>1914  | 192,952               | 149,835             | 44,876             | ..                  | 172,990           | 80,114             | 86,317          | ..               | ..              | 9,306               | 1,136            | 116            | 2,157                    |
| "<br>1913          | 128,087               | 86,890              | 8,909              | ..                  | 249,526           | 124,821            | 51,385          | ..               | 250             | 24,479              | 19,807           | 5,276          | 11,273                   |

# HEMP AND TOW GRADING RETURNS.

## DECEMBER.

*Hemp.*—The total number of bales graded was 6,645, as compared with 14,496 for the corresponding month of last year, a decrease of 7,851 bales. For the twelve months ending 31st December, 1914, the number of bales graded was 98,244, as compared with 166,550 for the previous twelve months, a decrease of 68,306 bales.

*Tow.*—During the month 1,814 bales were dealt with, as compared with 4,706 for the corresponding month of last year, a decrease of 2,892 bales. For the twelve months ending 31st December, 1914, the number of bales graded was 29,993, as compared with 56,320 for the previous twelve months, a decrease of 26,327 bales.

*Stripper-slips.*—During the month the number of bales graded was 100, as compared with 950 for the corresponding month of last year, a decrease of 850 bales. For the twelve months ending 31st December, 1914, the number of bales graded was 1,362.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF DECEMBER, 1914.

### *Hemp.*

| Port.                 | Superior. | Fine.  | Good-fair. | Fair.       |            | Common. | Rejected. | Condemned. | Total. |
|-----------------------|-----------|--------|------------|-------------|------------|---------|-----------|------------|--------|
|                       |           |        |            | High Point. | Low Point. |         |           |            |        |
|                       | Bales.    | Bales. | Bales.     | Bales.      | Bales.     | Bales.  | Bales.    | Bales.     | Bales. |
| Auckland ..           | ..        | ..     | 44         | 144         | 149        | 76      | ..        | 8          | 421    |
| Napier ..             | ..        | ..     | ..         | ..          | ..         | ..      | ..        | ..         | ..     |
| Foxton ..             | ..        | ..     | 1,283      | 1,155       | 195        | 67      | 24        | ..         | 2,724  |
| Wellington ..         | ..        | 211    | 1,076      | 1,088       | 193        | 67      | 55        | 9          | 2,699  |
| Blenheim ..           | ..        | 57     | ..         | ..          | ..         | ..      | ..        | ..         | 57     |
| Picton ..             | ..        | 41     | 5          | ..          | ..         | ..      | ..        | ..         | 46     |
| Lyttelton ..          | ..        | ..     | ..         | ..          | ..         | ..      | ..        | ..         | ..     |
| Dunedin ..            | ..        | 20     | 239        | 63          | ..         | ..      | ..        | ..         | 322    |
| Bluff ..              | ..        | ..     | 61         | 295         | 20         | ..      | ..        | ..         | 376    |
| Totals ..             | ..        | 329    | 2,708      | 2,745       | 557        | 210     | 79        | 17         | 6,645  |
| Percentages of totals | ..        | 4'95   | 40'75      | 41'3        | 8'38       | 3'16    | 1'18      | 0'25       | ..     |

### *Tow.*

| Port.         | First Grade. | Second Grade. | Third Grade. | Condemned. | Total. |
|---------------|--------------|---------------|--------------|------------|--------|
|               | Bales.       | Bales.        | Bales.       | Bales.     | Bales. |
| Auckland ..   | ..           | 50            | 89           | 13         | 152    |
| Napier ..     | ..           | ..            | ..           | ..         | ..     |
| Foxton ..     | 231          | 434           | 39           | ..         | 704    |
| Wellington .. | 143          | 314           | 128          | ..         | 585    |
| Blenheim ..   | ..           | 37            | ..           | ..         | 37     |
| Picton ..     | 26           | ..            | ..           | ..         | 26     |
| Lyttelton ..  | ..           | ..            | ..           | ..         | ..     |
| Dunedin ..    | 75           | 95            | 17           | ..         | 187    |
| Bluff ..      | ..           | 25            | 90           | 8          | 123    |
| Totals ..     | 475          | 955           | 363          | 21         | 1,814  |

*Stripper-slips*—Foxton: First grade, 10; second grade, 81—total, 91. Wellington: First grade, 9.

## NEW ZEALAND-SAN FRANCISCO TRADE.

FOLLOWING are the shipments of produce for San Francisco, Tahiti, and Rarotonga, and transhipments for Vancouver from New Zealand, since July last :—

|                                           | "Maitai,"<br>21st August. | "Moana,"<br>16th Sept. | "Marama,"<br>15th Oct. | "Maitai,"<br>12th Nov. | "Moana,"<br>10th Dec. |
|-------------------------------------------|---------------------------|------------------------|------------------------|------------------------|-----------------------|
| Gum, packages .. ..                       | ..                        | 6                      | 30                     | 12                     | 10                    |
| Seeds, sacks .. ..                        | ..                        | ..                     | ..                     | ..                     | ..                    |
| Grain, &c., sacks .. ..                   | 580                       | 172                    | 107                    | 32                     | 169                   |
| Meat, cases .. ..                         | 152                       | 48                     | 8                      | 37                     | 16                    |
| Onions, cases .. ..                       | 16                        | 3                      | 7                      | 2                      | 5                     |
| Potatoes, sacks .. ..                     | 28                        | 3                      | 29                     | 3                      | 10                    |
| Sundries, packages .. ..                  | 260                       | 1,512                  | 328                    | 629                    | 403                   |
| Butter, boxes .. ..                       | 7                         | ..                     | 5                      | 4                      | 521                   |
| Hemp, bales .. ..                         | ..                        | 98                     | 114                    | 456                    | 331                   |
| Frozen lamb, carcasses .. ..              | 2                         | 4                      | 2                      | 5                      | 5                     |
| Hides and sheep-skins, sacks<br>and bales | 527                       | 517                    | 463                    | 250                    | 88                    |

## NEW ZEALAND-VANCOUVER TRADE.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since July last :—

|                                      | "Marama,"<br>31st July. | "Makura,"<br>8th Sept. | "Niagara,"<br>1st Oct. | "Makura,"<br>29th Oct. | "Niagara,"<br>1st Dec. |
|--------------------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|
| Butter, boxes .. ..                  | 8,325                   | 6,036                  | 5,950                  | 4,850                  | 3,650                  |
| Mutton, carcasses .. ..              | 7                       | ..                     | ..                     | ..                     | ..                     |
| Lamb, .. ..                          | ..                      | ..                     | ..                     | ..                     | ..                     |
| Beef, quarters—pieces .. ..          | 900                     | ..                     | ..                     | ..                     | ..                     |
| Veal, carcasses .. ..                | ..                      | ..                     | ..                     | ..                     | ..                     |
| Frozen sundries, packages .. ..      | 84                      | 30                     | 36                     | ..                     | ..                     |
| Wool, bales .. ..                    | 25                      | ..                     | 127                    | 109                    | 348                    |
| Grass-seeds, beans, &c., sacks .. .. | 63                      | ..                     | 26                     | ..                     | 23                     |
| Hides and skins, sacks, &c. .. ..    | 193                     | ..                     | 1,103                  | 1,054                  | 2,442                  |
| Onions, cases .. ..                  | ..                      | ..                     | ..                     | ..                     | ..                     |
| Sheep-skins, bales .. ..             | 32                      | 6                      | 152                    | ..                     | 522                    |
| Jam, cases .. ..                     | 35                      | 65                     | 590                    | ..                     | 25                     |
| Sundries, packages .. ..             | 10                      | 4                      | 603                    | 45                     | 34                     |
| Pelts, casks .. ..                   | 4                       | 1                      | ..                     | 34                     | 25                     |
| Kauri-gum, packages .. ..            | 17                      | 6                      | 1,277                  | 840                    | 10                     |
| Hemp, bales .. ..                    | ..                      | 246                    | 744                    | 246                    | ..                     |
| Rabbits, crates .. ..                | ..                      | ..                     | ..                     | ..                     | ..                     |
| Timber, pieces .. ..                 | ..                      | ..                     | ..                     | ..                     | ..                     |
| Eggs, cases and crates .. ..         | 6                       | 149                    | 247                    | 974                    | 255                    |
| Meats (canned, &c.), cases .. ..     | 16                      | 35                     | 36                     | ..                     | ..                     |
| Cheese, crates .. ..                 | ..                      | ..                     | ..                     | ..                     | ..                     |
| Fresh fruit, cases .. ..             | ..                      | ..                     | ..                     | ..                     | ..                     |

## STOCK EXPORTED.

THE following table shows the numbers and descriptions of stock exported from the Dominion during the month of December, 1914:—

| Port of Shipment. | Horses.       |                     |            | Sheep.        |                     |                     | Cattle.       |                     |                | Pigs.         |                     | Dogs.         |                     |            |
|-------------------|---------------|---------------------|------------|---------------|---------------------|---------------------|---------------|---------------------|----------------|---------------|---------------------|---------------|---------------------|------------|
|                   | To Australia. | To Pacific Islands. | To London. | To Australia. | To Pacific Islands. | To U.S. of America. | To Australia. | To Pacific Islands. | To Montevideo. | To Australia. | To Pacific Islands. | To Australia. | To Pacific Islands. | To London. |
| Auckland ..       | 2             | 19                  | ..         | ..            | 45                  | ..                  | ..            | ..                  | ..             | ..            | I                   | ..            | ..                  | ..         |
| Gisborne ..       | ..            | ..                  | ..         | ..            | ..                  | ..                  | ..            | ..                  | ..             | ..            | ..                  | ..            | ..                  | ..         |
| Napier ..         | ..            | ..                  | ..         | ..            | ..                  | ..                  | ..            | ..                  | ..             | ..            | ..                  | ..            | ..                  | ..         |
| Wellington ..     | ..            | ..                  | ..         | ..            | ..                  | 5                   | ..            | ..                  | ..             | ..            | ..                  | 4             | I                   | ..         |
| Lyttelton ..      | 2             | ..                  | ..         | 106           | ..                  | 73                  | 25            | ..                  | ..             | ..            | ..                  | I             | ..                  | ..         |
| Dunedin ..        | ..            | ..                  | ..         | ..            | ..                  | ..                  | ..            | ..                  | ..             | ..            | ..                  | ..            | ..                  | ..         |
| Bluff ..          | ..            | ..                  | ..         | ..            | ..                  | ..                  | ..            | ..                  | ..             | ..            | ..                  | I             | ..                  | ..         |
| Totals ..         | 4             | 19                  | ..         | 106           | 45                  | 78                  | 25            | ..                  | ..             | ..            | I                   | 6             | I                   | ..         |

Auckland also exported 12 crates of poultry to the Pacific islands.

The following are particulars of horses exported: Polo ponies, 2; light horses, 11.

## STOCK IN QUARANTINE.

THE following stock were received into quarantine during the month of December, 1914:—

| No.                       | Description.  | Sex.       | Port of Origin. | Owner or Agent.                    | Address.       |
|---------------------------|---------------|------------|-----------------|------------------------------------|----------------|
| MOTUIHI ISLAND, AUCKLAND. |               |            |                 |                                    |                |
| I                         | Chihuahua dog | Male ..    | San Francisco   | Mrs. Bedford ..                    | Auckland.      |
| I                         | „             | Female     | Ditto ..        | „ ..                               | „              |
| SOMES ISLAND, WELLINGTON. |               |            |                 |                                    |                |
| I                         | Jersey        | .. Male .. | London ..       | Dr. Watson (Dalgety & Co., agents) | Bull's.        |
| I                         | „             | .. „ ..    | San Francisco   | E. Griffiths ..                    | New Plymouth.  |
| I                         | Collie        | .. „ ..    | London ..       | C. Fitzjohn ..                     | Martinborough. |
| 2                         | Collies       | .. „ ..    | Liverpool ..    | C. Hay (N.Z. Express Co., agents)  | Wanganui.      |